COUNTY OF SANTA CRUZ

PLANNING DEPARTMENT
701 OCEAN STREET, 4TH FLOOR, SANTA CRUZ, CA 95060
(831) 454-2580 FAX: (831) 454-2131 TDD: (831) 454-2123
TOM BURNS, PLANNING DIRECTOR

April 14, 2009

Building, Accessibility, and Fire Code Appeals Board
701 Ocean Street
Santa Cruz, CA, 95060

Subject: Michael Watson Appeal

Members of the Board:

On March 27, 2009, the Planning Department accepted an appeal by Claire Machado for Michael Watson (Attachment 1) of the requirement by the Planning Department that a soils report is required for the construction of a third floor addition and retaining wall for an existing single-family residence located at 11607 Lake Boulevard in Lompico.

Background

In 2004, this property was issued a red-tag by the Code Enforcement section of the Planning Department, due in part because the owner reconstructed the roof and attic to create a 3rd level (story). Since then, the property owner has been working to resolve the violation and has had at least two stipulated agreements with the County. On December 13, 2007, Building Permit Application 64947G was submitted. The permit description is as follows:

Rectify Red-Tag:

1. Recognize as-built roof framing to create a 516sf habitable 2nd floor at an existing 1-story SFD with habitable basement to include: 2 bedrooms (1 relocated from main floor), 1 bath, new exterior deck and new 540sf. stairwell that attaches all floors. Remodel to convert bedroom to living room at main floor. Results in a 2-story SFD with habitable basement to include: 3 bedrooms, 3 baths, kitchen, dining/family room, living room (called laundry/utility room) and decks.
2. Construct concrete retaining wall.

The plans submitted indicate the attic area will become a habitable 3rd floor, the foundation will be upgraded (underpinned) to 24" wide by 18" deep, loading of the retaining wall that supports the upslope portion of the home will be modified and that a new 4'-5" retaining wall will be constructed upslope of the structure.

Building Permit Review

Because Building Permit Application 64947G was submitted to the Planning Department on December 13, 2007, the California Building Code (CBC) in effect is the 2001 CBC. The first review of the Building Permit application was completed and a deficiency letter sent on January 11, 2008. This deficiency letter identified a number of things from several agencies that had to be added to the plans and provided for review before the Building Permit could be approved. The requirement for the soils report

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was made by the Environmental Planning staff based on a site visit, a detailed review of the plans for the proposed building permit and research of the project site, and stated the following:

Due to the expansion of the existing home by approximately 1012 square feet of new habitable space, the following reports are required:

1. A soils (geotechnical) report is required to determine the suitability of the foundation with respect to the steep slope and added loads. This report must include a slope stability analysis for the slope below the home, as it exceeds 50-70%.

2. You have the option of applying for a Geologic Hazard Assessment to determine the extent of geologic hazards on the subject property, or submit a Geologic Report completed by a licensed geologist through a consulting firm. This report must address potential slope instability within the project area, and make necessary recommendations for mitigation of any existing hazard. If you choose to apply for the GHA, the fee is approximately $1100 and may result in the requirement for the Geologic Report. To apply for the GHA, please bring two sets of the site plan to the Zoning Counter M-F 8-noon.

3. Engineered grading and drainage plans must be prepared for the proposed new driveway and parking area, as this area is extremely steep and subject to potential slope stability problems. The soils engineer must also provide recommendations for design characteristics of the driveway retaining wall.

Please note that lists of consulting firms are available through our website or in person at the Zoning Counter. Once the above items have been completed, please resubmit for review by the department civil engineer, geologist and staff planner. Further comments will be forthcoming once we have received these items.

On September 3, 2008, a revised set of plans was submitted in response to various issues identified in the deficiency letter. The response from the applicant to the requirement for the soils report was that the addition was 484 sf and, therefore, the requirement for a soils report did not apply.[1] On September 16, 2008, Environmental Planning staff entered the following comments in reaction to the resubmittal:

There are several thresholds for requiring geotechnical (soils) report. In addition to the square footage that has been added over time (which exceeds 500 square feet according to assessor's records) soils reports can be required for additions or conversions to habitable space whenever the site is located in an area of steep slopes or potential instability. Additionally, soils reports can be required for any projects that include new retaining walls, such as this application.

Therefore, after reviewing this project with both the Senior Civil Engineer and the County Geologist, I conclude that the comments contained in the first review on January 16, 2008 are still applicable and must be satisfied before this application can be approved.

On October 2, 2008, the applicant submitted a letter appealing the determination of the Environmental Planning staff to the Building and Fire Code Appeals Board. However, the required appeal fee was not included with the appeal letter. As a courtesy, Assistant Planning Director Mark Deming met with the applicant and his representative on October 30, 2008 to discuss the outstanding issues. Following the meeting, Mr. Deming asked Environmental Staff to re-examine the situation. Mr. Deming sent the applicant a letter on February 6, 2009 with his findings and informed the applicant that he had 14 days to file an appeal of the determination to the Building, Accessibility and Fire Code Appeals Board (Attachment 2). Due to an oversight in noticing, additional time was provided to the applicant to file an appeal. The applicant did file an appeal and pay the required fee on February 25, 2009 - within the

[1] The 2007 CBC requires that a soils report be prepared for every building permit. Santa Cruz County modified that requirement to exempt additions that are less than 500 sf. As noted above, this version of the CBC does not apply to this building permit application.

extended timeline provided by the Department. However, the letter that the applicant submitted for the appeal was the same letter that he had submitted in October 2008 and it was not responsive to the February 6, 2009 decision. Again, as a courtesy, the applicant was contacted and informed that the appeal letter needed to address the February 6, 2009 letter and be dated with a contemporary date. Additional time was granted to the applicant to complete the appeal letter. An updated appeal letter was received by the Planning Department on March 27, 2009, and that is the matter now before Your Board (Attachment 1).

Appeal Issues

The letter from the appellant describes the reasons for the appeal. The applicant disagrees with the Environmental Planning staff's requirement for a soils report because it is not a code requirement, there is no change to the foundation proposed, the requirement is based on judgment that there are known soils problems in the area and that conservative design standards were used in the design of the proposed retaining wall. The following analysis will address these issues.

Analysis of Appeal Issues

The requirement for a soils report by the Planning Department was required for this application based upon provisions in both the CBC and the County Code.

2001 CBC Requirements

The addition of a 3rd story adds new loads to the foundation. The 2001 CBC indicates that two story structures require a foundation that is 15" wide by 18" deep while three story structures require a foundation that is 18" wide by 24" deep (reference table 18-1-C, Attachment 4). Therefore, the entire foundation is required to be upgraded to meet the 2001 CBC and the submitted plans (sheet 12 of 13) and the structural calculations clearly propose new underpinning to deepen and widen the existing foundation to support the additional loads.

Under the 2001 CBC, adding a story and increasing the size of the foundation to meet the requirements of Chapter 18, does not always trigger the requirement for a soils report. However, Section 1804.1 of the 2001 CBC states, "The classification of the soils at each building site shall be determined when required by the building official. The building official may require that this determination be made by an engineer or architect licensed by the state to practice as such." The Building Official uses a variety of sources to decide whether to impose this requirement and has the authority to make this determination, as stated in the code.

The following information was used in this determination:

1. The site is mapped as falling within a "probable" landslide area on the Cooper-Clark Landslide Maps (see Attachment 5). This mapping is corroborated by a Geologic Hazards Assessment (GHA)(Attachment 6) performed in 1990 on the adjacent property just downslope (west) of this parcel. The GHA states,

   > "The entire parcel is situated within a "probable" Cooper-Clark mapped landslide. The colluvium exposed in cuts adjacent to the pad and Carrol St. (both its lateral extent and its inferred thickness) support the existence of the mapped landslide feature, at least at and adjacent this parcel. Extensive downslope activity (probably Jan '83 event) is evident south of the parcel (end of Arbol St.). Hummocky topography and distorted growth patterns in redwoods are prevalent on the parcel. Possible detachment features and elongate basinal depressions are likely east and south of the parcel. The potential hazard for slope failure to impact development on this parcel during the expected lifetime of the structure is, in a

likelihood, very high and needs to be thoroughly evaluated in a geologic investigation." (Page 3, Item 7)

The presence of a landslide supports the need for a soils report. A soils report will be able to determine the depth required for the foundation to be founded on competent non-landslide material.

2. A soils report (Attachment 7) performed on a parcel 200 feet North of Mr. Watson's property indicates that the site is underlain by up to 10 feet of very loose colluvium. Therefore the need for a soils report is further substantiated to make sure that the foundation is founded below the loose colluvium.

3. The project plans do not conform to the standard CBC requirements for setbacks from slopes.

   Section 1806.5.1, Section 1806.5.3 and Figure 18-I-1 of the 2001 CBC require foundations to be set back from slopes in excess of 33% by a distance of H/3 (where H is the height of the slope), and Mr. Watson's house is located above slopes of approximately 70%.

   Given a slope height of 70 feet and a 70% slope, the required setback from the foundation to the face of slope would be 23 feet. Given that the current structure is only setback from the slope between 2 and 9 feet (based upon field measurements by County staff), the required foundation depth would range from 10 feet to 14 feet below the ground surface (see Attachment 8). This is substantially deeper than the 18" as is being proposed on the plans.

   Furthermore, Section 1806.5.3 of the 2001 CBC states,

   > "footing on or adjacent to slope surfaces shall be founded in firm material with an embedment and setback from the slope surface sufficient to provide vertical and lateral support for the footing without differential settlement".

   Section 1806.5.6 goes on to state that the Building Official may approve alternate setbacks and clearances and that, "The building official may require an investigation and recommendation of a qualified engineer to demonstrate that the intent of the section has been satisfied. Such an investigation shall include consideration of material, height of slope, slope gradient, load intensity and erosion characteristics of slope material."

   Therefore, a soils report is needed to assure that the alternate setback is permissible.

The fact that the site is mapped as a "probable" landslide, a geologic hazards investigation of the property just downslope of the property indicate the presence of landslide debris in the slope, a soils report 200 feet to the north of the subject property indicates the presence of up to 10' of landslide material on the slope, and the foundations do not meet setback requirements from ascending slopes of the CBC all support the need for a soils report for this project.

County Code Requirements

County Code Section 16.10.050 (a) (see Attachment 9) states, "All development is required to comply with the provisions of this chapter" and Section 16.10.050 (e) further states that "additional information (including but not limited to full geologic report, subsurface geologic, hydrologic, **geotechnical** [emphasis added] or other engineering investigation and reports) shall be required when a hazard or foundation constraint requiring further investigation is identified."

This project meets the definition of development per section 16.10.040(s) for several reasons:

- The proposed project increases habitable space by more than 50% during the lifetime of the structure. (16.10.040 (s)(3))

  County Records indicate the original structure built in 1946 was a 320 sf habitable structure. In 1980 a permit was issued to for an addition to make the structure 1,088 sf. The proposed habitable square footage of the structure is 2,070 sf. This represents an approximately 547% increase over the original 1946 structure and a 90% increase in habitable space to the structure as modified per the 1980 building permit.

- The proposal upgrades more than 50% of the foundation. (16.10.040(s)(6))
- A retaining wall is proposed that requires a building permit. (16.10.040(s)(12))

Therefore the requirement for a soils report is justified based on County Code as well as the 2001 CBC.

In summary, the foundation on this structure is affected in various ways. The addition of a third story adds new loads to the foundation. In addition, the structure is located on a mapped landslide and the presence of loose near surface soils existing on a parcel just downslope of Mr. Watson's parcel as well on a parcel 200 feet to the north support the need for a soils report. Merely upgrading the foundation to 24" wide by 18" deep is not a conservative design since it does not take into account the presence of a landslide, loose soils or the proximity to the adjacent slopes.

The authority to require a soils report exists in the 2001 CBC Code sections referenced above as well as in the County's Geologic Hazards Ordinance. From staff's perspective, allowing the Building Permit to proceed without the needed geotechnical analysis would raise potentially significant risks for residents of the structure.

It is therefore RECOMMENDED that your Board deny the appeal.

Sincerely,

Jennifer Hutchinson
Chief Building Official

By: _____
Kent Edler, PE

Attachments:

1. Letter of Claire Machado (for Michael Watson), dated February 20, 2009
2. Letter of Mark Deming, dated February 6, 2009
3. Project Plans
4. Chapter 18 of the 2001 CBC
5. Location Map Showing Adjacent Studies and Landslide Limits
6. Geologic Hazards Assessment on Parcel 075-124-19
7. Soils Report for 11677 Lake Blvd.
8. Cross Sections Showing Foundation Setbacks Required per 2001 CBC Section 1806.5
9. County Code Chapter 16.10 – Geologic Hazards Ordinance

Rec'd 3/27/09
MD

February 20, 2009**

Mark Deming

County of Santa Cruz Planning Dept

701 Ocean Street, Room 400

Santa Cruz, CA 95060

RE: 075-124-21, Building Permit Application 64947G

Dear Mr Deming:

I am in receipt of your letter dated February 6, 2009 regarding my appeal to the Building and Fire Code Appeals Board submitted October 2, 2008 appealing the staff determination regarding a soils report requirement. As your letter states in paragraph 3, number 1, this is not a code requirement under the 2001 Uniform Building Code. The structure has remained in place since 1947 and the plans are not changing the exterior footing of the foundation. Paragraph 3, number 2, states 'because of known problems with soils in this area', staff has made a 'judgment. Other than being in an area that was 'generally mapped' within the Coopers-Clark slide area. There is absolutely no evidence at the site location that there is or has ever been any risk of landsliding or slope failure, either above or below the residence, regardless of the angle of the existing slopes.

The retaining wall was proposed to mitigate any such hazard above the residence and has been designed to County standards by a registered Civil Engineer, Bob Patterson. Conservative design standards were utilized, and we do not see a need to become even more so.

We believe the requirement for a soils report in this case is punitive, and cannot agree with the staff's judgment and their respective determinations. As such, we are appealing this again.

By the way, the appeal filed in October 2008 was to the Board of Appeals, not staff, and was found to be valid by your Department upon its filing in October 2008. The fact that the Planning Department did not have a standard process to accept appeals and appeal fees and/or did not have the State required Appeals Board in place to hear my appeal in a timely manner, is not my fault or problem. These issues should be addressed by Planning Management so that other appellants have an easy, straightforward path to appeal to the Board that is required by law to hear the appeal. While I appreciate that you chose to review/reconsider the situation is commendable but the result are the same. I should not have to appeal this new determination, as the appeal for the first one was valid.

Thank you for your time and consideration, I look forward to meeting with the Appeals Board.

Claire Machado for Michael Watson

Michael Watson, 11607 Lake Blvd, Felton, CA 95018

Cc: Claire Machado

** Dated per your request

ATTACHMENT 1

COUNTY OF SANTA CRUZ

PLANNING DEPARTMENT

701 OCEAN STREET, 4TH FLOOR, SANTA CRUZ, CA 95060
(831) 454-2580 FAX: (831) 454-2131 TDD: (831) 454-2123
TOM BURNS, PLANNING DIRECTOR

February 6, 2009

Mr. Michael Watson
11607 Lake Boulevard
Felton, CA 95018

RE: Building permit application 64947G APN 075-124-21

Dear Mr. Watson:

This letter is intended to provide you with a written response to the information that you submitted to me as a part of our discussions on October 30th. As you may recall, you had submitted a letter on October 2, 2008, appealing the determination of Robin Bolster following the second review of your Building Permit application. You apparently had not received anything from the County regarding that determination and you were, therefore, appealing from the posting of the requirement on the computer system to preserve your appeal rights. When you appealed this determination in October 2008, you did not pay any appeal fee.

We met on October 30th and discussed the changes you had made to the plans after the first submittal and why you felt that the requirement for a soils report was not warranted for this Building Permit application. The primary reason you stated was that the third floor addition did not exceed the 500-sf threshold for the soils report requirement and that the house was on stable soil, held in place by a number of large Redwoods that were located down-slope of the house. At the conclusion of the meeting, I indicated that I was going to have our geologist and civil engineer take a closer look at the revised plans and possibly visit the site to verify if a soils report was indeed necessary. In addition, I was going to take a closer look at the plans.

The following conclusions were reached following the additional reviews noted above:

1. The 500-sf threshold does not apply to your Building Permit application as your application was filed on December 13, 2007. The review of your application is under the 2001 California Building Code (CBC), not the 2007 CBC that became effective for applications filed after January 1, 2008. Accordingly, there is no requirement for or exception for the requirement for a soils report. The requirement is entirely based on the judgment of the plans checker or, in this case, the environmental planner who consulted with the Department civil engineer to ascertain if a soils report should be required. So, the size of the addition was not a factor in the decision to require a soils report.

2. The soils report requirement is primarily based on the location of the existing house on a steep slope (50-75% grade; a slope with an angle of 45 degrees is a 100% grade) and the fact that your engineer has proposed substantial new foundation upgrades to support the added weight/loading of the third floor. While it was recognized that your engineer utilized a conservative factor for

soils strength, because of the known problems with soils in this area, additional information is needed to verify if those factors adequately describe the actual soils.

In conclusion, I must agree with the recommendations of staff that a soils report be provided. Not only is it a matter of safety and welfare for you and you family, but also for those who might live in the house in the future. I apologize for the length of time it took to complete this review. If you wish to appeal this determination, you have 14 days from the date of service that is attached to submit an appeal letter and fee.

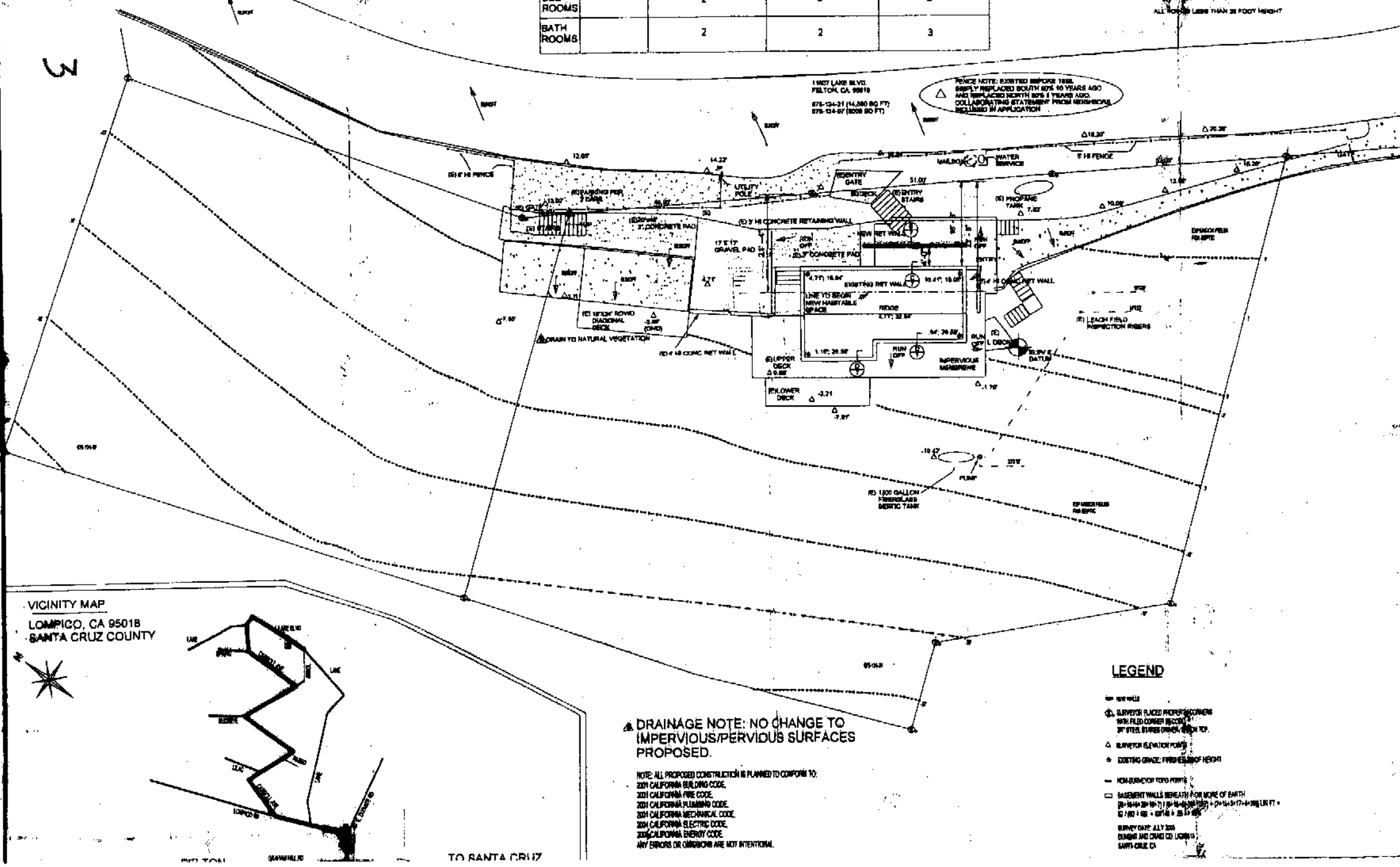
Sincerely,

Mark M. Deming, AICP
Assistant Planning Director

cc: Claire Machado

ATTACHMENT 3

BUILDING STATISTICS				
		EXISTING 1998	AS BUILT	PROPOSED
FLOOR AREA	BASEMENT	451	496	496
	MAIN	638	638	638
	ATTIC	0	516 (NON-HABITABLE)	484 (HABITABLE)
	TOTAL	1089	1650	1618
DECK AREA	BASEMENT	501	893	929
	MAIN	702	729	729
	ATTIC	0	0	28
	TOTAL	1203	1622	1686
BED ROOMS		2	2	2
BATH ROOMS		2	2	3



BUILDING HEIGHT CALCULATIONS:

ALL ROOFS LESS THAN 28 FOOT HEIGHT

11607 LAKE BLVD.
FELTON, CA. 95018
075-124-21 (14,500 SQ FT)
075-124-07 (8000 SQ FT)

FENCE NOTE: EXISTED BEFORE 1998. SIMPLY REPLACED SOUTH 60% 10 YEARS AGO AND REPLACED NORTH 80% 5 YEARS AGO. COLLABORATING STATEMENT FROM NEIGHBORS INCLUDED IN APPLICATION

DRAINAGE NOTE: NO CHANGE TO IMPERVIOUS/PERVIOUS SURFACES PROPOSED.

NOTE: ALL PROPOSED CONSTRUCTION IS PLANNED TO CONFORM TO:
2001 CALIFORNIA BUILDING CODE.
2001 CALIFORNIA FIRE CODE.
2001 CALIFORNIA PLUMBING CODE.
2001 CALIFORNIA MECHANICAL CODE.
2004 CALIFORNIA ELECTRIC CODE.
2005 CALIFORNIA ENERGY CODE.
ANY ERRORS OR OMISSIONS ARE NOT INTENTIONAL.

LEGEND

- NEW WALLS
- SURVEYOR PLACED PROPERTY CORNERS WITH FILED CORNER RECORD
- SURVEYOR ELEVATION POINTS
- EXISTING GRADE; FINISHED ROOF HEIGHT
- NON-SURVEYOR TOPO POINTS
- BASEMENT WALLS BENEATH 4 OR MORE OF EARTH

SURVEY DATE: JULY 2005

REVISIONS	BY
6/31/08	MW
9-3-08	

PLOT PLAN

BUILDING RENOVATION PLAN
11607 LAKE BLVD.
FELTON, CA. 95018
075-124-21 (14,500 SQ FT)
075-124-07 (8000 SQ FT)

DRAWN: M. WATSON
CHECKED:
DATE: 12/12/07
SCALE: 1" = 10'-0"
JOB NO.:
SHEET: 1 of 13
OF SHEETS

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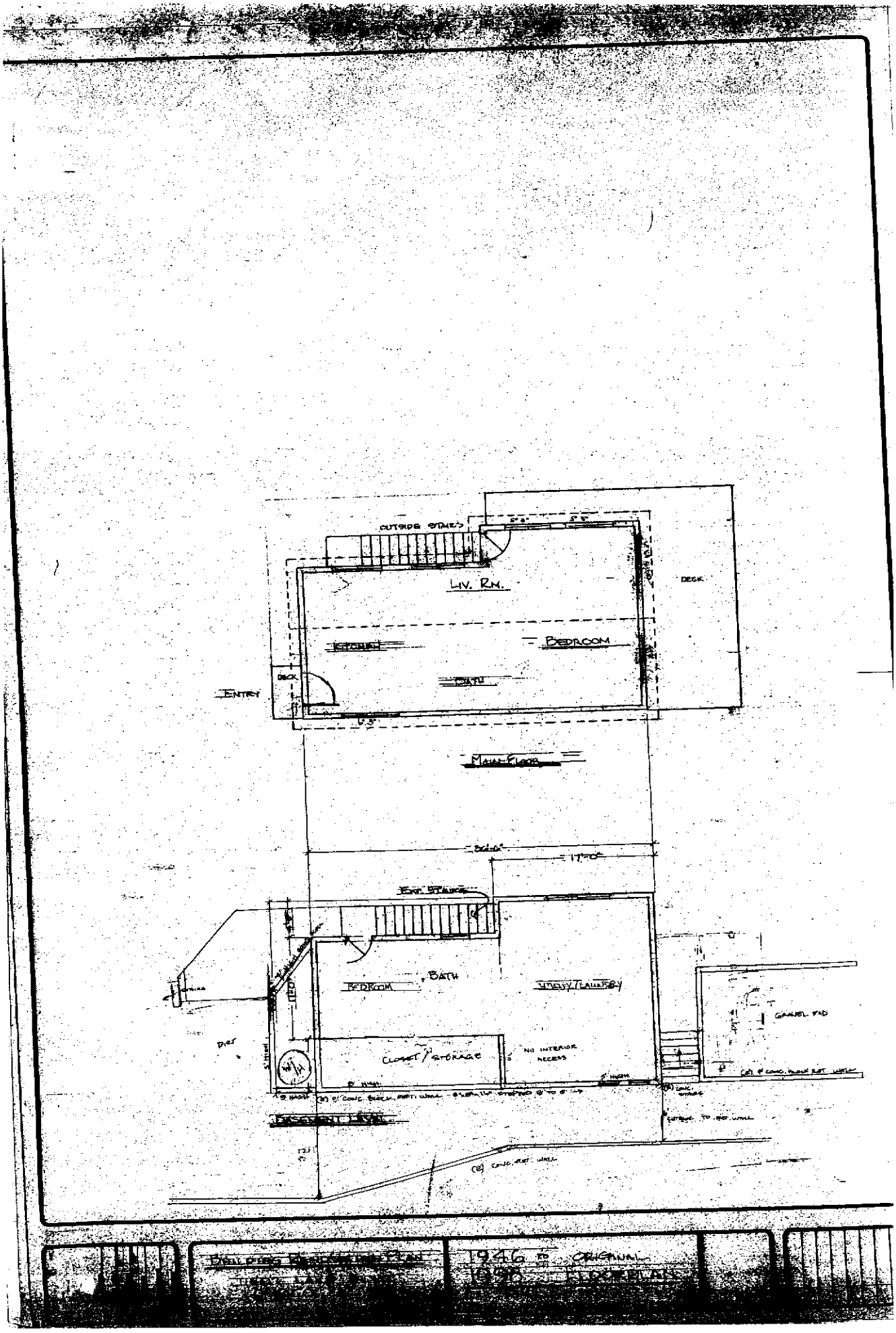
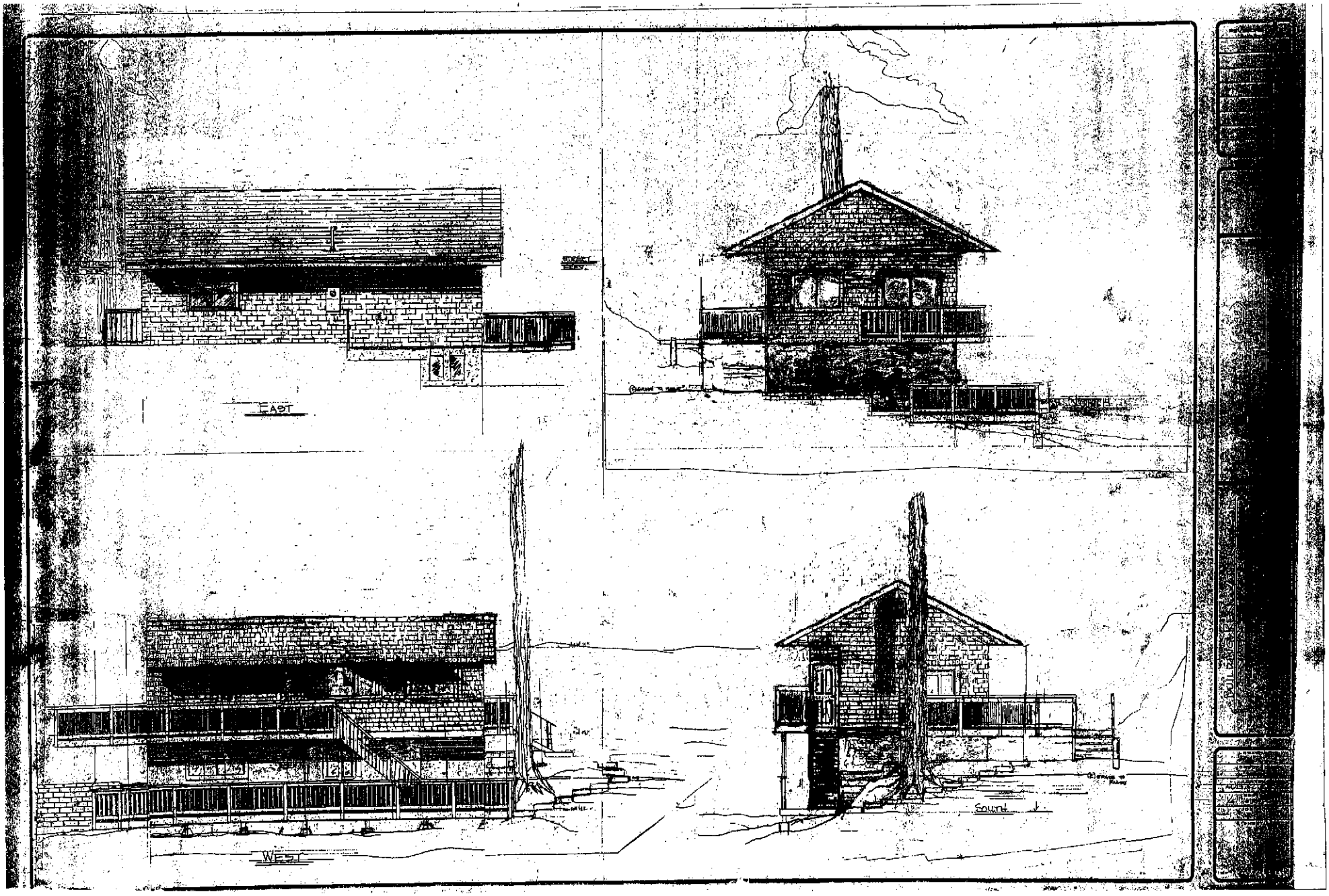
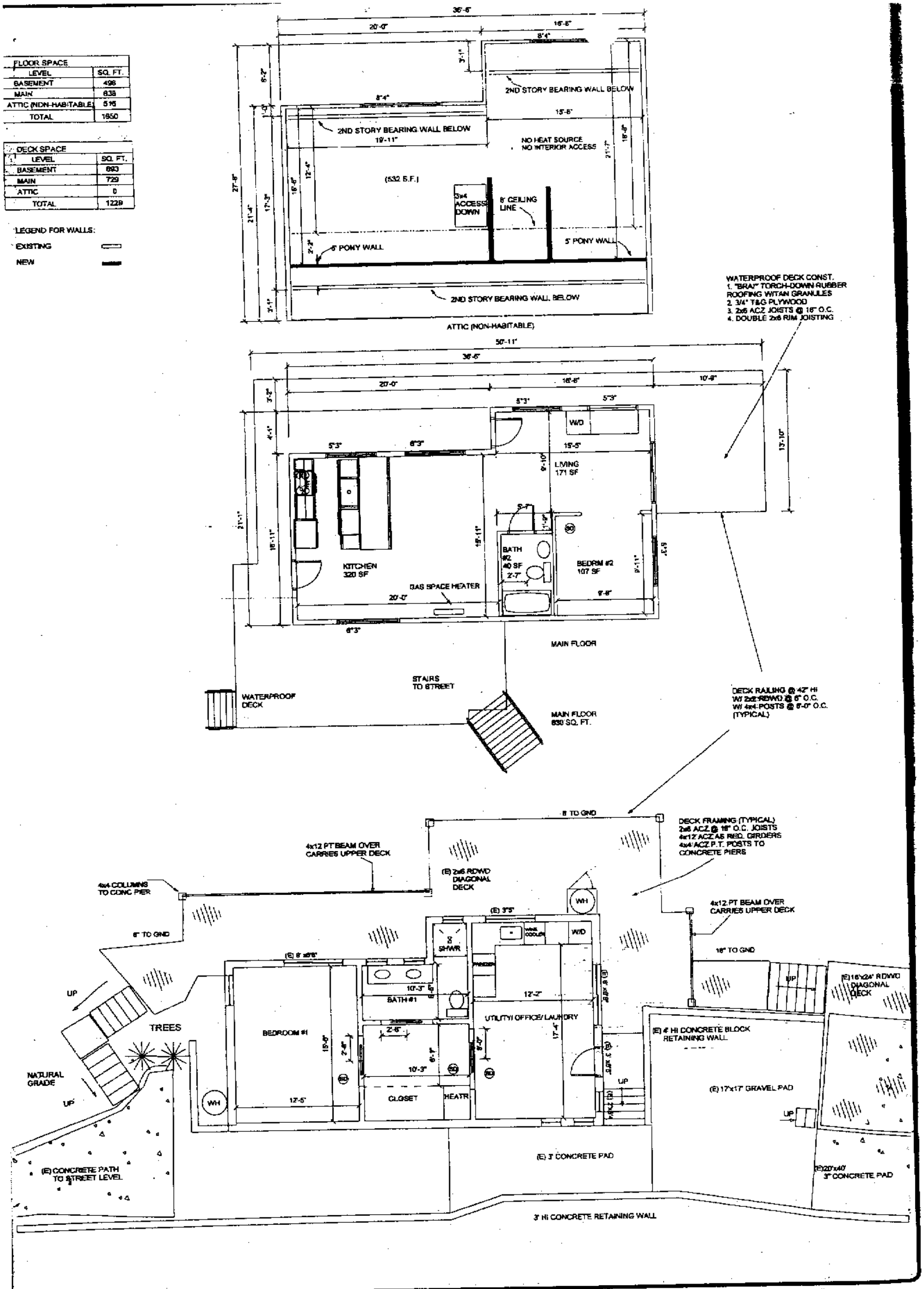

OUTSIDE STAIRS
LIV. RM.
DESK
KITCHEN
BEDROOM
BACK
ENTRY
BATH
MAIN FLOOR
BEDROOM
BATH
UTILITY/LAUNDRY
DOOR
DIET
CLOSET/STORAGE
NO INTERIOR NECESS
GRAVEL PAD
BASEMENT LEVEL


EAST
WEST
South

FLOOR SPACE	
LEVEL	SQ. FT.
BASEMENT	496
MAIN	638
ATTIC (NON-HABITABLE)	516
TOTAL	1650

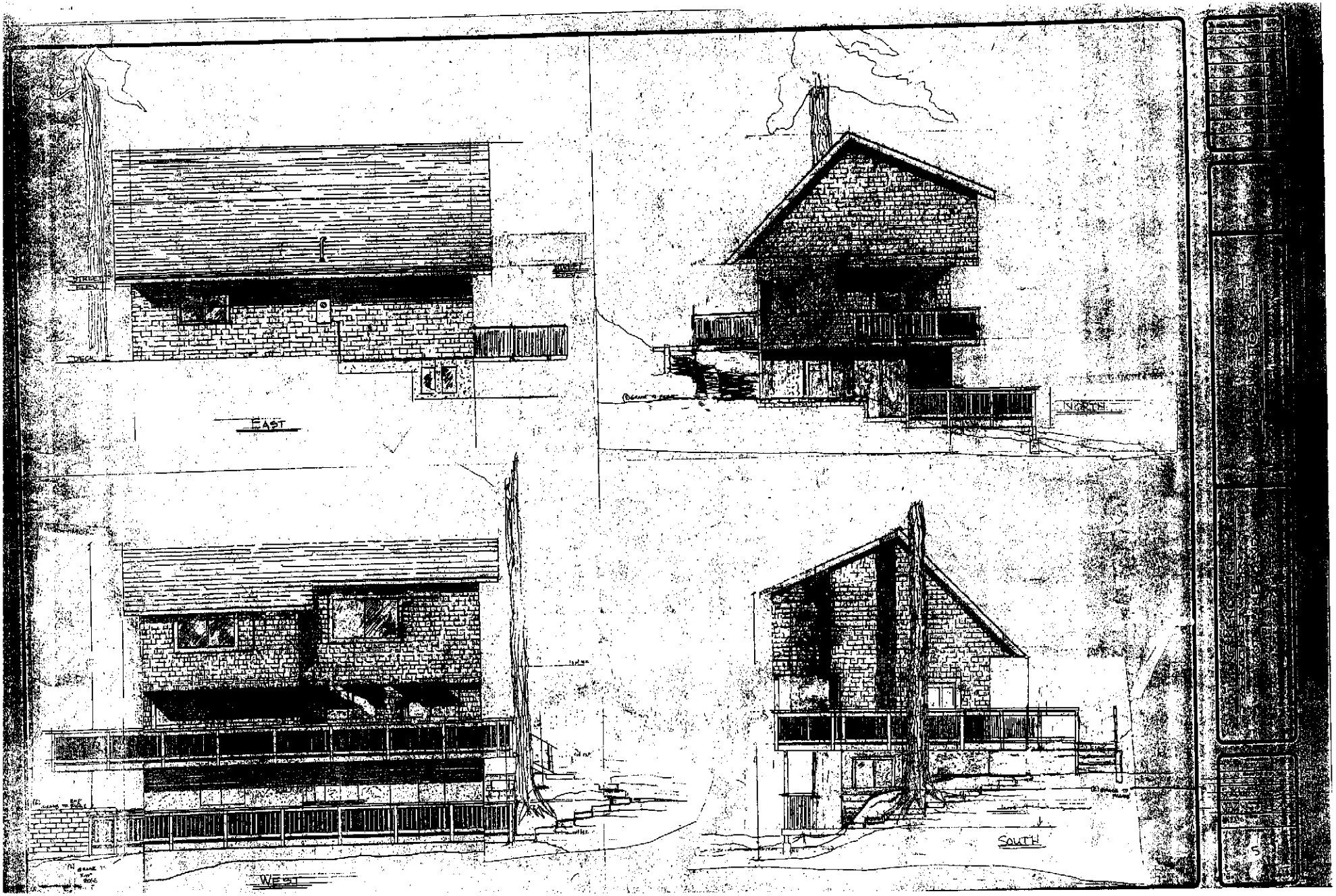
DECK SPACE	
LEVEL	SQ. FT.
BASEMENT	693
MAIN	729
ATTIC	0
TOTAL	1229

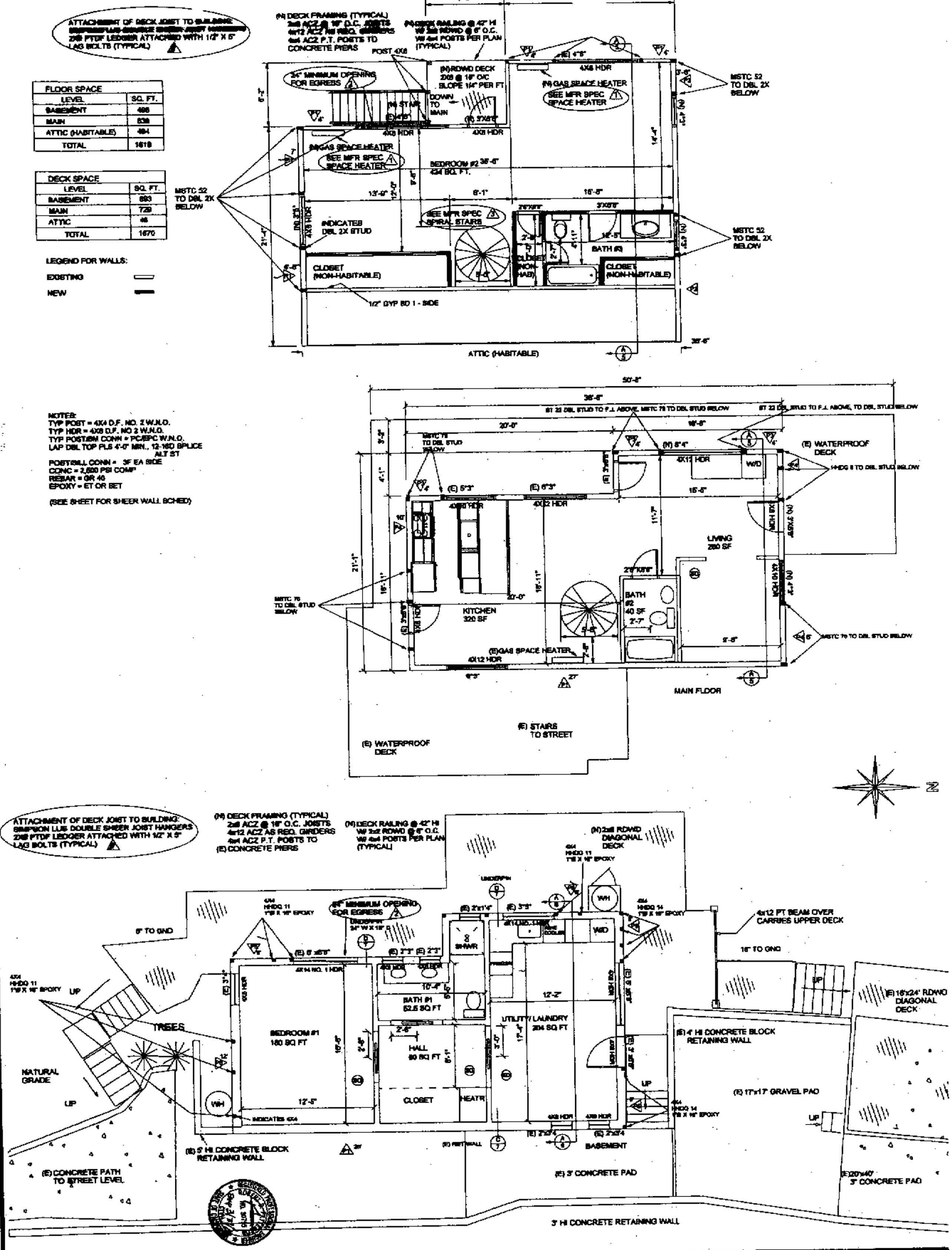
LEGEND FOR WALLS:
EXISTING
NEW



BUILDING RENOVATION PLAN 11607 LAKE BLVD. LOMPICO CA, 95018	EXISTING FLOOR PLANS	REVISIONS

DRAWN M. Watson
CHECKED
DATE 12/12/07
SCALE 1/4" = 1'-0"
JOB NO.
SHEET 4 of 13 SHEETS


EAST
NORTH
WEST
SOUTH



FLOOR SPACE	
LEVEL	SQ. FT.
BASEMENT	496
MAIN	538
ATTIC (HABITABLE)	484
TOTAL	1618

DECK SPACE	
LEVEL	SQ. FT.
BASEMENT	893
MAIN	729
ATTIC	48
TOTAL	1670

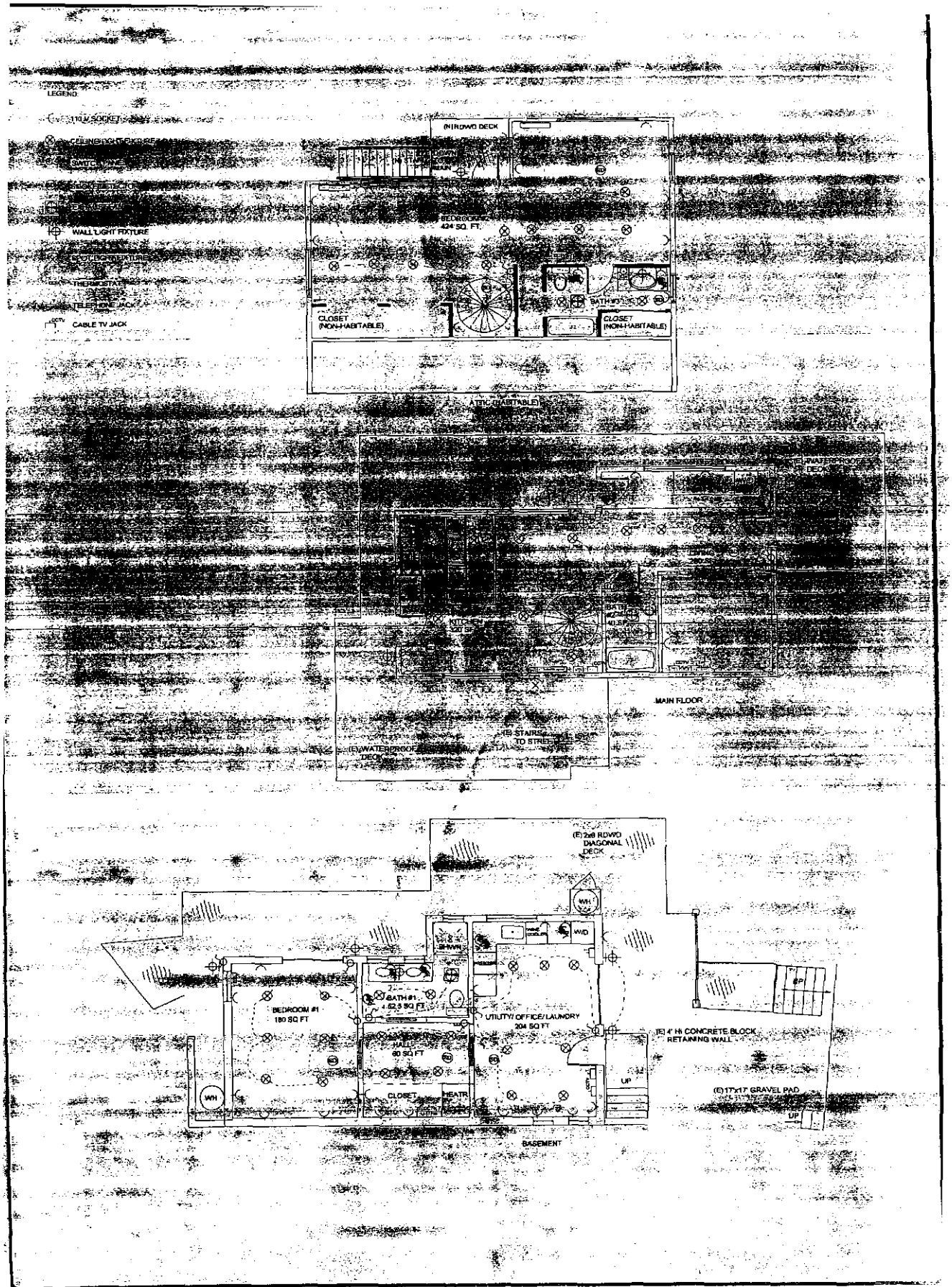
BUILDING RENOVATION PLAN
11607 LAKE BLVD.
LOMPICO CA, 95018

PROPOSED FLOOR PLANS

DATE 12/12/07
SCALE 1/4" = 1'-0"
SHEET 6 of 13 SHEETS

7

EAST
WEST



BUILDING RENOVATION PLAN 11607 LAKE BLVD. LOMPICO CA, 95018	ELECTRICAL PLANS		

DRAWN: M. Watson
CHECKED:
DATE: 12/12/07
SCALE: 1/4" = 1'-0"
JOB NO.
SHEET: 8 of 13 SHEETS

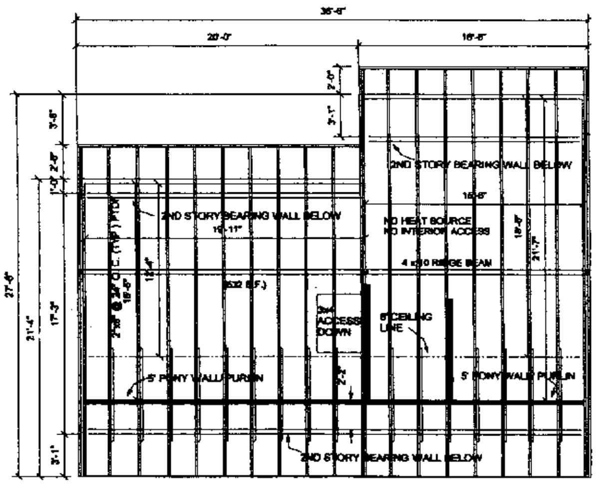
7

FLOOR SPACE	
LEVEL	SQ. FT.
BASEMENT	496
MAIN	836
ATTIC (NON-HABITABLE)	518
TOTAL	1850

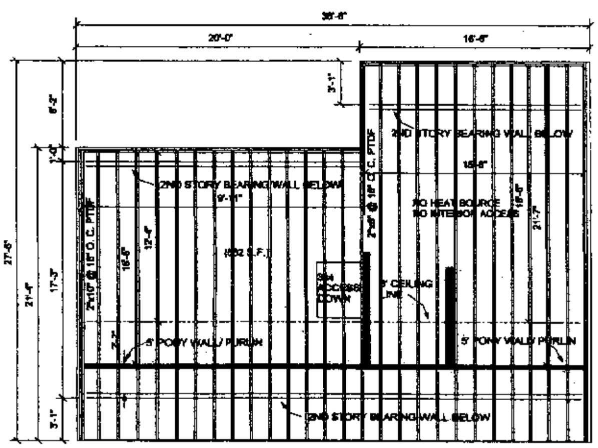
DECK SPACE	
LEVEL	SQ. FT.
BASEMENT	[illegible]
MAIN	729
ATTIC	0
TOTAL	1229

LEGEND FOR WALLS:

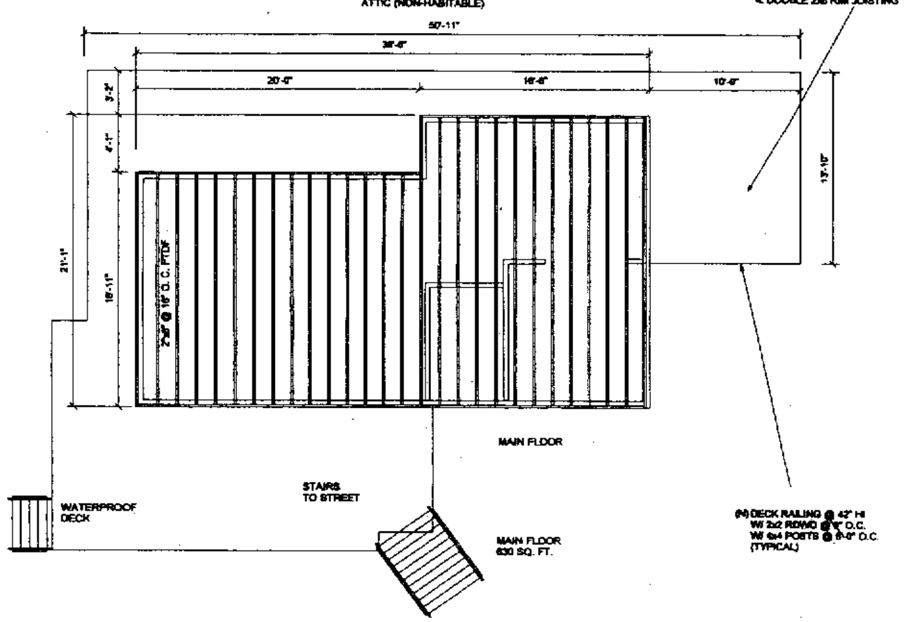
EXISTING



ATTIC (NON-HABITABLE)



ATTIC (NON-HABITABLE)

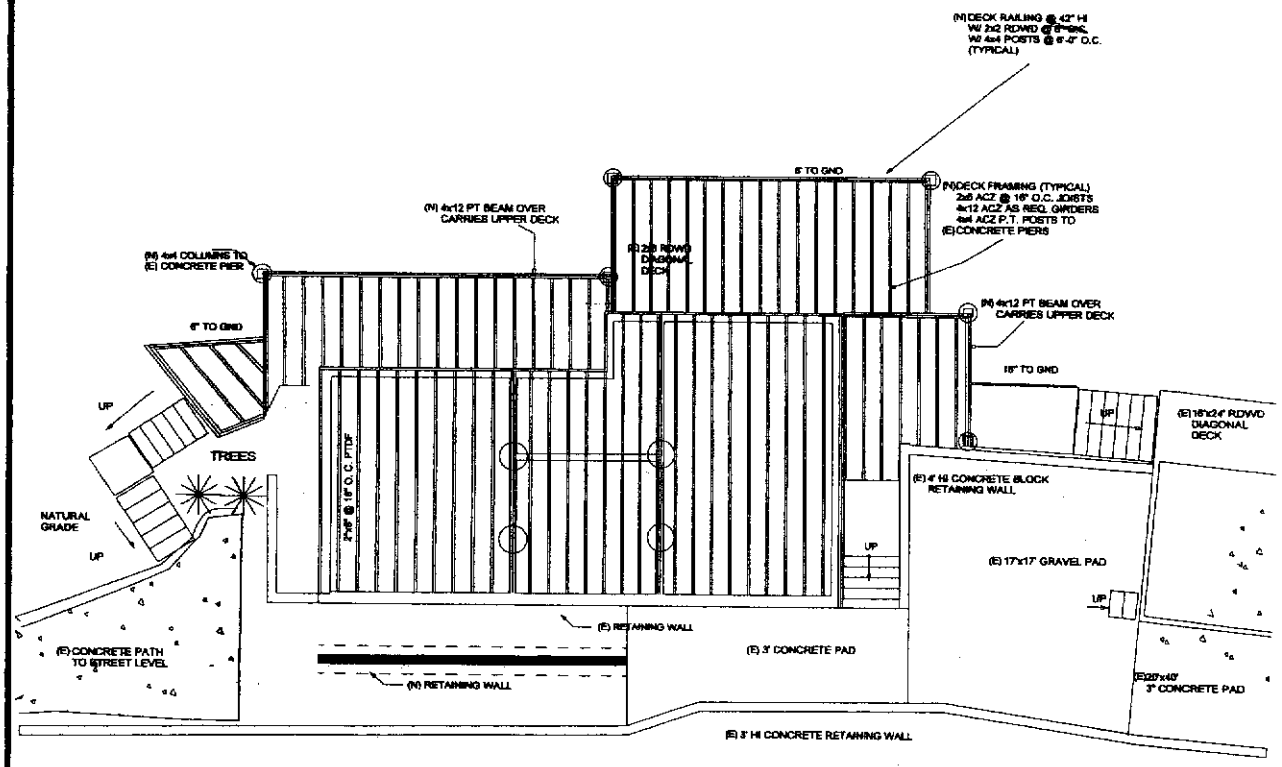


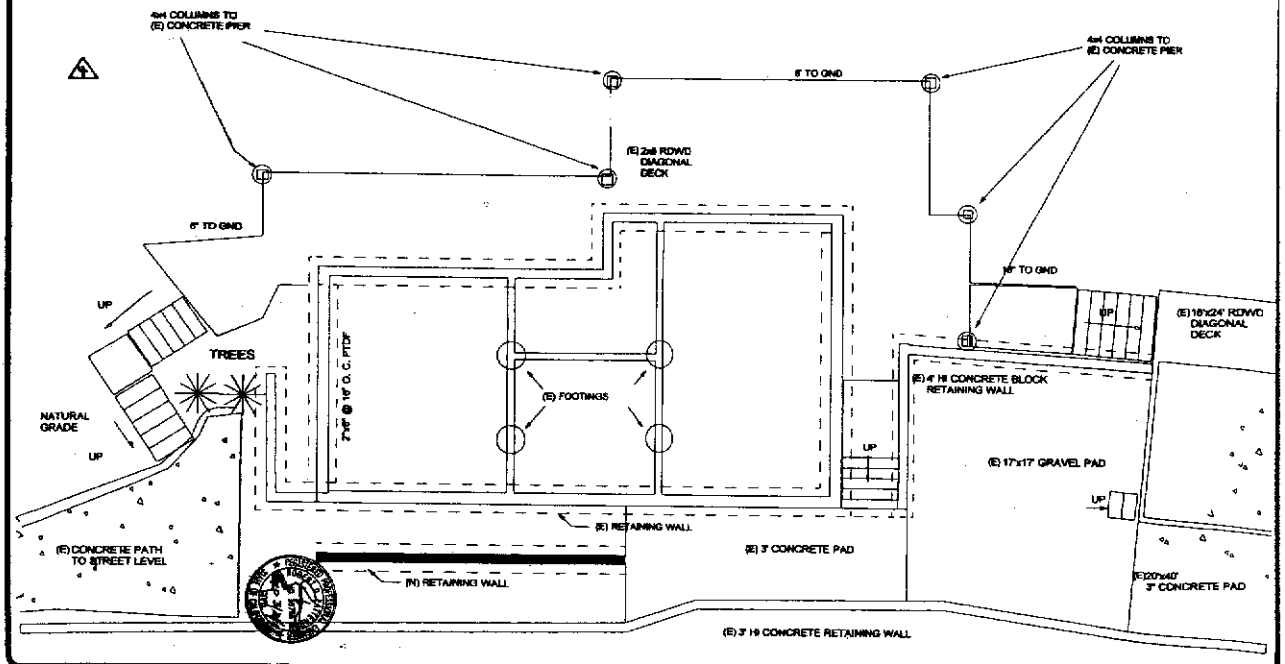
SHEET 9 of 13 SHEETS
SCALE 1/4" = 1'-0"
DATE 12/12/07
DRAWN [redacted]

BUILDING RENOVATION PLAN
11607 LAKE BLVD.
LOMPICO CA, 95018

AS BUILT FRAMING
MAIN FLOOR & ATTIC FLOOR & ROOF

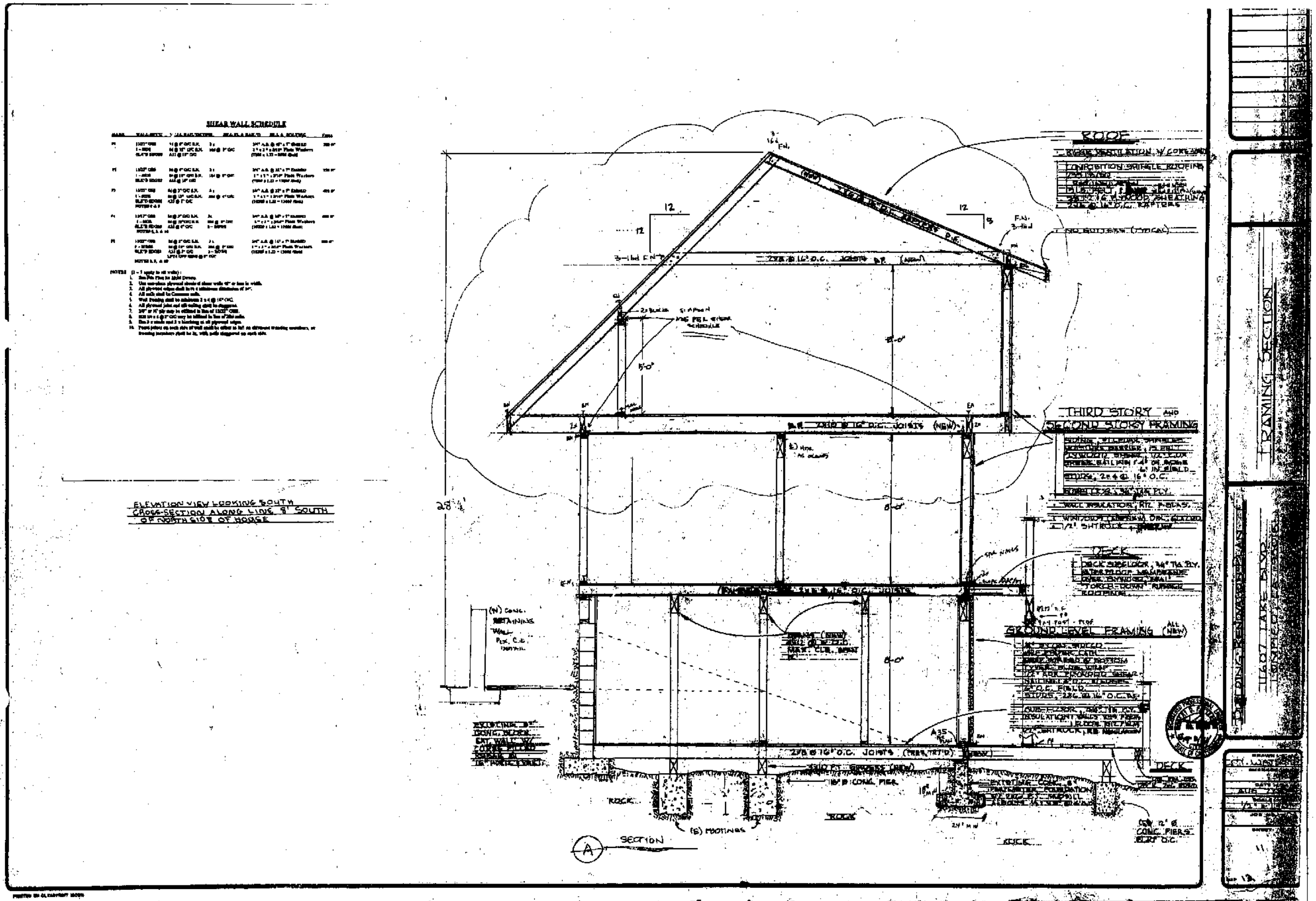
REVISIONS | BY



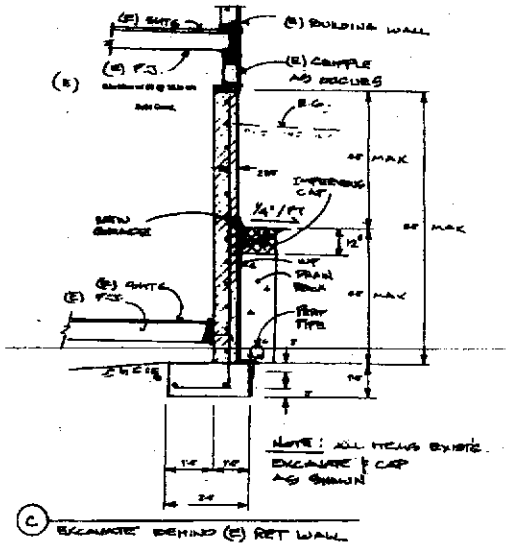


OF 10 of 13 SHEETS	DRAWN [redacted] DATE 12/12/07 SCALE 1/4" = 1'-0" DRAWING NO.	BUILDING RENOVATION PLAN 11607 LAKE BLVD. LOMPICO CA, 95018	AS BUILT BASEMENT FRAMING AND FOUNDATION	REVISIONS 6/3/08 MW BY

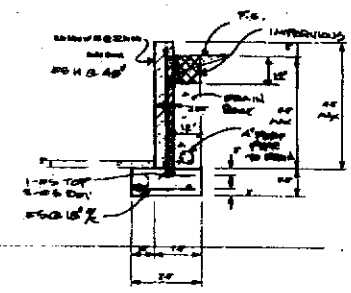
7


SHEAR WALL SCHEDULE
ELEVATION VIEW LOOKING SOUTH
CROSS-SECTION ALONG LINE 8' SOUTH
OF NORTH SIDE OF HOUSE
ROOF
THIRD STORY AND
SECOND STORY FRAMING
DECK
GROUND LEVEL FRAMING (ALL NEW)
2x8 @ 16" O.C. JOISTS (NEW)
2x6 @ 16" O.C. JOISTS (PRES. TRT'D)
(N) CONC. RETAINING WALL
ROCK
(E) FOOTINGS
SECTION
A
28'
12
FRAMING SECTION
11607 LAKE BLVD

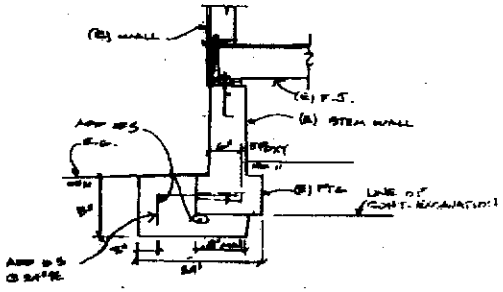
7



(C) EXCAVATE BEHIND (E) RET WALL



(B) NEW SITE RET WALL



(D) NEW UNDERPINNING

NOTE: PLANS ARE INTENDED TO CONFORM WITH ALL ADOPTED UNIFORM CODES (1997) WITH ALL LOCAL AMENDMENTS.. 2001 NEC, 1997 U.P.C.

ALL CONSTRUCTION TO BE IN CONFORMANCE WITH THESE CODES.

BUILDING RENOVATION PLAN
11607 LAKE BLVD.
LOMPICO CA, 95018

DETAILS PER
ROBERT "PATTERSON", C.E.

Certificate Of Compliance : Residential (Part 1 of 3) CF-1R

12/12/2007

	Standard Design	Proposed Design	Compliance Margin
	24.58	25.17	-0.58
	3.22	0.59	2.63
	1.50	1.09	0.41
	12.80	12.71	0.09
	0.00	0.00	0.00
	42.10	39.56	2.54
			6.0%

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Certificate Of Compliance : Residential (Part 2 of 3) CF-1R

Building renovation

12/12/2007

Certificate Of Compliance : Residential (Part 3 of 3) CF-1R

Building renovation

12/12/2007

HVAC SYSTEMS

HVAC DISTRIBUTION

WATER HEATING SYSTEMS

REMARKS

COMPLIANCE STATEMENT

T-24 LLC Corporation 2007 NEVADA

12.12.07

Mandatory Measures Summary: Residential (Page 1 of 2) MF-1R

Space Conditioning, Water Heating and Plumbing System Measures:

Mandatory Measures Summary: Residential (Page 2 of 2) MF-1R

T-24 LLC

California Title 24 Energy Compliance

Building Renovation

T-24

Chapter 18 is printed in its entirety in Volume 2 of the *Uniform Building Code*. Excerpts from Chapter 18 are reprinted herein.

NOTE: For requirements of applications subject to the approval of DSA/SS and OSHPD, see Volume 2.

Excerpts from Chapter 18
FOUNDATIONS AND RETAINING WALLS
Division I—GENERAL

SECTION 1801 — SCOPE

1801.1 General. This chapter sets forth requirements for excavation and fills for any building or structure and for foundations and retaining structures.

Reference is made to Appendix Chapter 33 for requirements governing excavation, grading and earthwork construction, including fills and embankments.

1801.2 Standards of Quality. The standards listed below labeled a "UBC Standard" are also listed in Chapter 35, Part II, and are part of this code.

1. **Testing.**
   1.1 UBC Standard 18-1, Soils Classification
   1.2 UBC Standard 18-2, Expansion Index Test

SECTION 1802 — QUALITY AND DESIGN

The quality and design of materials used structurally in excavations, footings and foundations shall conform to the requirements specified in Chapters 16, 19, 21, 22 and 23.

Excavations and fills shall comply with Chapter 33.

Allowable bearing pressures, allowable stresses and design formulas provided in this chapter shall be used with the allowable stress design load combinations specified in Section 1612.3.

[For HCD 1] EXCEPTION: For limited-density owner-built rural dwellings, pier foundations, stone masonry footings and foundations, pressure-treated lumber, poles, or equivalent foundation materials or designs may be used provided that the bearing is sufficient for the purpose intended.

SECTION 1803 — SOIL CLASSIFICATION—EXPANSIVE SOIL

1803.1 General. For the purposes of this chapter, the definition and classification of soil materials for use in Table 18-I-A shall be according to UBC Standard 18-1.

1803.2 Expansive Soil. When the expansive characteristics of a soil are to be determined, the procedures shall be in accordance with UBC Standard 18-2 and the soil shall be classified according to Table 18-I-B. Foundations for structures resting on soils with an expansion index greater than 20, as determined by UBC Standard 18-2, shall require special design consideration. If the soil expansion index varies with depth, the variation is to be included in the engineering analysis of the expansive soil effect upon the structure.

SECTION 1804 — FOUNDATION INVESTIGATION

1804.1 General. The classification of the soil at each building site shall be determined when required by the building official. The building official may require that this determination be made by an engineer or architect licensed by the state to practice as such.

NOTE [For HCD 1]: Subject to other provisions of law, the applicable sections and subsections of the Health and Safety Code are repeated here for clarity and read as follows:

Section 17953. Each city, county, and city and county shall enact an ordinance which requires a preliminary soil report, prepared by a civil engineer who is registered by the state, based upon adequate test borings or excavations, of every subdivision, where a tentative and final map is required pursuant to Section 66426 of the Government Code.

The preliminary soil report may be waived if the building department of the city, county or city and county, or other enforcement agency charged with the administration and enforcement of the provisions of this part, shall determine that, due to the knowledge such department has as to the soil qualities of the soil of the subdivision or lot, no preliminary analysis is necessary.

Section 17954. If the preliminary soil report indicates the presence of critically expansive soils or other soil problems which, if not corrected, would lead to structural defects, such ordinance shall require a soil investigation of each lot in the subdivision.

The soil investigation shall be prepared by a civil engineer who is registered in this state. It shall recommend corrective action which is likely to prevent structural damage to each dwelling proposed to be constructed on the expansive soil.

Section 17955. The building department of each city, county, or city and county, or other enforcement agency charged with the administration and enforcement of the provisions of this part, shall approve the soil investigation if it determines that the recommended action is likely to prevent structural damage to each dwelling to be constructed. As a condition to the building permit, the ordinance shall require that the approved recommended action be incorporated in the construction of each dwelling. Appeal from such determination shall be to the local appeals board.

1804.2 Investigation. The classification shall be based on observation and any necessary tests of the materials disclosed by borings or excavations made in appropriate locations. Additional studies may be necessary to evaluate soil strength, the effect of moisture variation on soil-bearing capacity, compressibility, liquefaction and expansiveness.

In Seismic Zones 3 and 4, when required by the building official, the potential for seismically induced soil liquefaction and soil instability shall be evaluated as described in Section 1804.5.

EXCEPTIONS: 1. The building official may waive this evaluation upon receipt of written opinion of a qualified geotechnical engineer or geologist that liquefaction is not probable.

2. A detached, single-story dwelling of Group R, Division 3 Occupancy with or without attached garages.

3. Group U, Division 1 Occupancies.

4. Fences.

1804.3 Reports. The soil classification and design-bearing capacity shall be shown on the plans, unless the foundation conforms to Table 18-I-C. The building official may require submission of a written report of the investigation, which shall include, but need not be limited to, the following information:

1. A plot showing the location of all test borings and/or excavations.

ATTACHMENT 4

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2. Descriptions and classifications of the materials encountered.

3. Elevation of the water table, if encountered.

4. Recommendations for foundation type and design criteria, including bearing capacity, provisions to mitigate the effects of expansive soils, provisions to mitigate the effects of liquefaction and soil strength, and the effects of adjacent loads.

5. Expected total and differential settlement.

1804.4 Expansive Soils. When expansive soils are present, the building official may require that special provisions be made in the foundation design and construction to safeguard against damage due to this expansiveness. The building official may require a special investigation and report to provide these design and construction criteria.

1804.5 Liquefaction Potential and Soil Strength Loss. When required by Section 1804.2, the potential for soil liquefaction and soil strength loss during earthquakes shall be evaluated during the geotechnical investigation. The geotechnical report shall assess potential consequences of any liquefaction and soil strength loss, including estimation of differential settlement, lateral movement or reduction in foundation soil-bearing capacity, and discuss mitigating measures. Such measures shall be given consideration in the design of the building and may include, but are not limited to, ground stabilization, selection of appropriate foundation type and depths, selection of appropriate structural systems to accommodate anticipated displacements, or any combination of these measures.

The potential for liquefaction and soil strength loss shall be evaluated for a site peak ground acceleration that, as a minimum, conforms to the probability of exceedance specified in Section 1631.2. Peak ground acceleration may be determined based on a site-specific study taking into account soil amplification effects. In the absence of such a study, peak ground acceleration may be assumed equal to the seismic zone factor in Table 16-I.

1804.6 Adjacent Loads. Where footings are placed at varying elevations, the effect of adjacent loads shall be included in the foundation design.

1804.7 Drainage. Provisions shall be made for the control and drainage of surface water around buildings. (See also Section 1806.5.5.)

1804.8 [For OSHPD 2] Engineering Geologic Reports.

1804.8.1 Geologic and earthquake engineering reports shall be required for all proposed construction.

EXCEPTIONS: 1. Reports are not required for one-story, wood-frame and light-steel-frame buildings of Type V construction and 4,000 square feet (371 m^2) or less in floor area; nonstructural associated structural or nonrequired structural alterations and incidental structural additions or alterations, and structural repairs for other than earthquake damage.

2. A previous report for a specific site may be resubmitted, provided that a reevaluation is made and the report is found to be currently appropriate.

1804.8.2 The purpose of the engineering geologic report shall be to identify geologic and seismic conditions that may require project mitigations. The reports shall contain data which provide an assessment of the nature of the site and potential for earthquake damage based on appropriate investigations of the regional and site geology, project foundation conditions and the potential seismic shaking at the site. The report shall be prepared by a California-certified engineering geologist in consultation with a California-registered geotechnical engineer. The engineering geologic report shall not contain design criteria, but shall contain basic data to be used for a preliminary earthquake engineering evaluation of the project.

The preparation of the engineering geologic report shall be done in conformance with the most recent Division of Mines and Geology (DMG) Notes 44, 42 and 43; Guidelines for preparing Engineering Geologic Reports, and Guidelines to Geologic/Seismic Reports, respectively. Upperbound earthquakes, proposed in the Engineering Geologic Report, must be fully supported by satisfactory data and analysis. In addition, the most recent version of DMG Special Publication 42, Fault Rupture Hazard Zones in California, shall be considered for project sites proposed within an Alquist-Priolo Special Studies Zone.

The report shall include, but shall not be limited to, the following:

1. Geologic investigation.

2. Evaluation of the known active and potentially active faults, both regional and local, including estimates of their upperbound earthquakes and maximum probable earthquake, as defined DMG Note 43, and estimates of the peak ground accelerations at the site resulting from these earthquakes.

3. Evaluation of slope stability at or near the site, and the liquefaction and settlement potential of the earth materials in the foundation.

1804.8.3 The engineering geologic report shall be submitted to the Office of Statewide Health Planning and Development for review and approval. The review shall determine whether potential geologic problems and hazards are adequately identified and described in order to provide a timely completion of the subsequent geotechnical report, described in Section 1804.9.1.1. The Office of Statewide Health Planning and Development, with consultation of its advisors, may require additional information, analysis and/or clarification of potential geologic problems affecting the proposed building site before approval is given. The results of the approved engineering geologic report shall be used as a basis for further investigations for the geotechnical report. Approval of the engineering geologic report by the Office of Statewide Health Planning and Development shall be required prior to the submission of the geotechnical report.

1804.9 Geotechnical and Supplemental Ground-response Reports.

1804.9.1 Geotechnical report.

1804.9.1.1 The geotechnical report shall provide completed evaluations of the foundation conditions of the site and the potential geologic/seismic hazards affecting the site. The geotechnical report shall include, but shall not be limited to, site-specific evaluations of design criteria related to the nature and extent of foundation materials, groundwater conditions, liquefaction potential, settlement potential and slope stability. The report shall contain the results of the analyses of problem areas identified in the engineering geologic report. The geotechnical report shall incorporate estimates of the characteristics of site ground motion provided in the engineering geologic report. The estimates of ground motion shall not be structural design criteria, but shall be provided to characterize the seismic environment of the site, with consideration of the upper-bound earthquakes reported in the engineering geologic report. The ground-motion estimates shall include, but shall not be limited to, peak ground motions and predominant period. The estimates should be derived by accepted methods of current seismological practice, and fully documented in the geologic report.

The geotechnical report shall be prepared by a geotechnical engineer registered in the state of California with the advice of the certified engineering geologist and other technical experts, as

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necessary. The approved engineering geologic report shall be submitted with or as part of the geotechnical report.

1804.9.1.2 The geotechnical report shall be submitted to the Office of Statewide Health Planning and Development for review and approval. The review shall determine whether potential geologic hazards and foundation problems have been adequately evaluated. The Office of Statewide Health Planning and Development, with the consultation of its advisors, may require additional information, analysis or clarification of potential geotechnical issues affecting the proposed building site before approving the geotechnical report.

Approval of the geotechnical report by the Office of Statewide Health Planning and Development shall be required prior to the completion of the supplemental ground-response report, if required, as described in Section 1804.9.1.3. The need for a supplemental ground-response report shall be determined during the review of the geotechnical report. The results of the geotechnical report shall be used as a guide for further investigations for the supplemental ground-response report.

*1804.9.1.3 **Supplemental ground-response report.** A supplemental ground-response report may be required, containing a ground-motion element and an advanced geotechnical element.*

1804.9.1.3.1 The ground-motion element shall be prepared when required by the approved geotechnical report, or when required for dynamic analysis procedure described under Section 1631.2. The ground-motion element shall be prepared by a registered civil engineer or geophysicist (depending on the scope of the element) licensed in the state of California, and having professional specialization in earthquake analyses. The ground-motion element shall present a detailed characterization of earthquake ground motions for the site, which incorporates data given in the geotechnical report. The level of ground motion considered by the ground-motion element shall be as described in Section 1631.2. The characterization of ground motion in the ground-motion element shall be given, according to the requirements of the analysis, in terms of:

1. Peak acceleration, bracketed duration and predominant period.

2. Elastic structural-response spectra.

3. Time-history plot of predicted ground motion at the site.

4. Other analyses in conformance with accepted engineering and seismological practice.

1804.9.1.3.2 The advanced geotechnical element shall contain the results of dynamic geotechnical analysis specified by the approved geotechnical report.

The supplemental ground-response report shall be submitted to the Office of Statewide Health Planning and Development for review and approval. The review shall determine whether the ground-motion response evaluations of the site are adequately represented. The Office of Statewide Health Planning and Development, under consultation with its advisors, may require additional information, analysis or clarification of potential ground-response issues reported in the supplemental ground-response report for the proposed building site.

SECTION 1805 — ALLOWABLE FOUNDATION AND LATERAL PRESSURES

The allowable foundation and lateral pressures shall not exceed the values set forth in Table 18-I-A unless data to substantiate the use of higher values are submitted. Table 18-I-A may be used for design of foundations on rock or nonexpansive soil for Type II One-hour, Type II-N and Type V buildings that do not exceed three stories in height or for structures that have continuous footings having a load of less than 2,000 pounds per lineal foot (29.2 kN/m) and isolated footings with loads of less than 50,000 pounds (222.4 kN).

Allowable bearing pressures provided in Table 18-I-A shall be used with the allowable stress design load combinations specified in Section 1612.3.

SECTION 1806 — FOOTINGS

1806.1 General. Footings and foundations shall be constructed of masonry, concrete or treated wood in conformance with Division II and shall extend below the frost line. Footings of concrete and masonry shall be of solid material. Foundations supporting wood shall extend at least 6 inches (152 mm) above the adjacent finish grade. Footings shall have a minimum depth as indicated in Table 18-I-C, unless another depth is recommended by a foundation investigation.

The provisions of this section do not apply to building and foundation systems in those areas subject to scour and water pressure by wind and wave action. Buildings and foundations subject to such loads shall be designed in accordance with approved national standards. See Section 3302 for subsoil preparation and wood form removal.

1806.2 Footing Design. Except for special provisions of Section 1808 covering the design of piles, all portions of footings shall be designed in accordance with the structural provisions of this code and shall be designed to minimize differential settlement when necessary and the effects of expansive soils when present.

Slab-on-grade and mat-type footings for buildings located on expansive soils may be designed in accordance with the provisions of Division III or such other engineering design based on geotechnical recommendation as approved by the building official.

1806.3 Bearing Walls. Bearing walls shall be supported on masonry or concrete foundations or piles or other approved foundation system that shall be of sufficient size to support all loads. Where a design is not provided, the minimum foundation requirements for stud bearing walls shall be as set forth in Table 18-I-C, unless expansive soils of a severity to cause differential movement are known to exist.

EXCEPTIONS: 1. A one-story wood- or metal-frame building not used for human occupancy and not over 400 square feet (37.2 m^2) in floor area may be constructed with walls supported on a wood foundation plate when approved by the building official.

2. The support of buildings by posts embedded in earth shall be designed as specified in Section 1806.8. Wood posts or poles embedded in earth shall be pressure treated with an approved preservative. Steel posts or poles shall be protected as specified in Section 1807.9.

1806.4 Stepped Foundations. Foundations for all buildings where the surface of the ground slopes more than 1 unit vertical in 10 units horizontal (10% slope) shall be level or shall be stepped so that both top and bottom of such foundation are level.

1806.5 Footings on or Adjacent to Slopes.

1806.5.1 Scope. The placement of buildings and structures on or adjacent to slopes steeper than 1 unit vertical in 3 units horizontal (33.3% slope) shall be in accordance with this section.

1806.5.2 Building clearance from ascending slopes. In general, buildings below slopes shall be set a sufficient distance from the slope to provide protection from slope drainage, erosion and shallow failures. Except as provided for in Section 1806.5.6 and

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Figure 18-I-1, the following criteria will be assumed to provide this protection. Where the existing slope is steeper than 1 unit vertical in 1 unit horizontal (100% slope), the toe of the slope shall be assumed to be at the intersection of a horizontal plane drawn from the top of the foundation and a plane drawn tangent to the slope at an angle of 45 degrees to the horizontal. Where a retaining wall is constructed at the toe of the slope, the height of the slope shall be measured from the top of the wall to the top of the slope.

1806.5.3 Footing setback from descending slope surface. Footing on or adjacent to slope surfaces shall be founded in firm material with an embedment and setback from the slope surface sufficient to provide vertical and lateral support for the footing without detrimental settlement. Except as provided for in Section 1806.5.6 and Figure 18-I-1, the following setback is deemed adequate to meet the criteria. Where the slope is steeper than 1 unit vertical in 1 unit horizontal (100% slope), the required setback shall be measured from an imaginary plane 45 degrees to the horizontal, projected upward from the toe of the slope.

1806.5.4 Pools. The setback between pools regulated by this code and slopes shall be equal to one half the building footing setback distance required by this section. That portion of the pool wall within a horizontal distance of 7 feet (2134 mm) from the top of the slope shall be capable of supporting the water in the pool without soil support.

1806.5.5 Foundation elevation. On graded sites, the top of any exterior foundation shall extend above the elevation of the street gutter at point of discharge or the inlet of an approved drainage device a minimum of 12 inches (305 mm) plus 2 percent. The building official may approve alternate elevations, provided it can be demonstrated that required drainage to the point of discharge and away from the structure is provided at all locations on the site.

1806.5.6 Alternate setback and clearance. The building official may approve alternate setbacks and clearances. The building official may require an investigation and recommendation of a qualified engineer to demonstrate that the intent of this section has been satisfied. Such an investigation shall include consideration of material, height of slope, slope gradient, load intensity and erosion characteristics of slope material.

1806.6 Foundation Plates or Sills. Wood plates or sills shall be bolted to the foundation or foundation wall. Steel bolts with a minimum nominal diameter of $^1/_2$ inch (12.7 mm) shall be used in Seismic Zones 0 through 3. Steel bolts with a minimum nominal diameter of $^5/_8$ inch (16 mm) shall be used in Seismic Zone 4. Bolts shall be embedded at least 7 inches (178 mm) into the concrete or masonry and shall be spaced not more than 6 feet (1829 mm) apart. There shall be a minimum of two bolts per piece with one bolt located not more than 12 inches (305 mm) or less than seven bolt diameters from each end of the piece. A properly sized nut and washer shall be tightened on each bolt to the plate. Foundation plates and sills shall be the kind of wood specified in Section 2306.4.

1806.6.1 Additional requirements in Seismic Zones 3 and 4. The following additional requirements shall apply in Seismic Zones 3 and 4.

1. Sill bolt diameter and spacing for three-story raised wood floor buildings shall be specifically designed.

2. Plate washers a minimum of 2 inch by 2 inch by $^3/_{16}$ inch (51 mm by 51 mm by 4.8 mm) thick shall be used on each bolt.

1806.7 Seismic Zones 3 and 4. In Seismic Zones 3 and 4, horizontal reinforcement in accordance with Sections 1806.7.1 and 1806.7.2 shall be placed in continuous foundations to minimize differential settlement. Foundation reinforcement shall be provided with cover in accordance with Section 1907.7.1.

1806.7.1 Foundations with stemwalls. Foundations with stemwalls shall be provided with a minimum of one No. 4 bar at the top of the wall and one No. 4 bar at the bottom of the footing.

1806.7.2 Slabs-on-ground with turned-down footings. Slabs-on-ground with turned-down footings shall have a minimum of one No. 4 bar at the top and bottom.

EXCEPTION: For slabs-on-ground cast monolithically with a footing, one No. 5 bar may be located at either the top or bottom.

1806.8 Designs Employing Lateral Bearing.

1806.8.1 General. Construction employing posts or poles as columns embedded in earth or embedded in concrete footings in the earth may be used to resist both axial and lateral loads. The depth to resist lateral loads shall be determined by means of the design criteria established herein or other methods approved by the building official.

1806.8.2 Design criteria.

1806.8.2.1 Nonconstrained. The following formula may be used in determining the depth of embedment required to resist lateral loads where no constraint is provided at the ground surface, such as rigid floor or rigid ground surface pavement.

$$d = \frac{A}{2}\left(1 + \sqrt{1 + \frac{4.36h}{A}}\right) \qquad (6\text{-}1)$$

WHERE:

$A = \frac{2.34P}{S_1 b}$

b = diameter of round post or footing or diagonal dimension of square post or footing, feet (m).

d = depth of embedment in earth in feet (m) but not over 12 feet (3658 mm) for purpose of computing lateral pressure.

h = distance in feet (m) from ground surface to point of application of "P."

P = applied lateral force in pounds (kN).

S_1 = allowable lateral soil-bearing pressure as set forth in Table 18-I-A based on a depth of one third the depth of embedment (kPa).

S_3 = allowable lateral soil-bearing pressure as set forth in Table 18-I-A based on a depth equal to the depth of embedment (kPa).

1806.8.2.2 Constrained. The following formula may be used to determine the depth of embedment required to resist lateral loads where constraint is provided at the ground surface, such as a rigid floor or pavement.

$$d^2 = 4.25\frac{Ph}{S_3 b} \qquad (6\text{-}2)$$

1806.8.2.3 Vertical load. The resistance to vertical loads is determined by the allowable soil-bearing pressure set forth in Table 18-I-A.

1806.8.3 Backfill. The backfill in the annular space around columns not embedded in poured footings shall be by one of the following methods:

1. Backfill shall be of concrete with an ultimate strength of 2,000 pounds per square inch (13.79 MPa) at 28 days. The hole shall not be less than 4 inches (102 mm) larger than the diameter of the column at its bottom or 4 inches (102 mm) larger than the diagonal dimension of a square or rectangular column.

2. Backfill shall be of clean sand. The sand shall be thoroughly compacted by tamping in layers not more than 8 inches (203 mm) in depth.

1806.8.4 Limitations. The design procedure outlined in this section shall be subject to the following limitations:

The frictional resistance for retaining walls and slabs on silts and clays shall be limited to one half of the normal force imposed on the soil by the weight of the footing or slab.

Posts embedded in earth shall not be used to provide lateral support for structural or nonstructural materials such as plaster, masonry or concrete unless bracing is provided that develops the limited deflection required.

1806.9 Grillage Footings. When grillage footings of structural steel shapes are used on soils, they shall be completely embedded in concrete with at least 6 inches (152 mm) on the bottom and at least 4 inches (102 mm) at all other points.

1806.10 Bleacher Footings. Footings for open-air seating facilities shall comply with Chapter 18.

> **EXCEPTIONS:** Temporary open-air portable bleachers as defined in Section 1008.2 may be supported upon wood sills or steel plates placed directly upon the ground surface, provided soil pressure does not exceed 1,200 pounds per square foot (57.5 kPa).

SECTION 1807 — PILES — GENERAL REQUIREMENTS

1807.1 General. Pile foundations shall be designed and installed on the basis of a foundation investigation as defined in Section 1804 where required by the building official.

The investigation and report provisions of Section 1804 shall be expanded to include, but not be limited to, the following:

1. Recommended pile types and installed capacities.

2. Driving criteria.

3. Installation procedures.

4. Field inspection and reporting procedures (to include procedures for verification of the installed bearing capacity where required).

5. Pile load test requirements.

The use of piles not specifically mentioned in this chapter shall be permitted, subject to the approval of the building official upon submission of acceptable test data, calculations or other information relating to the properties and load-carrying capacities of such piles.

1807.2 Interconnection. Individual pile caps and caissons of every structure subjected to seismic forces shall be interconnected by ties. Such ties shall be capable of resisting, in tension or compression, a minimum horizontal force equal to 10 percent of the larger column vertical load.

> **EXCEPTION:** Other approved methods may be used where it can be demonstrated that equivalent restraint can be provided.

1807.3 Determination of Allowable Loads. The allowable axial and lateral loads on piles shall be determined by an approved formula, by load tests or by a foundation investigation.

1807.4 Static Load Tests. When the allowable axial load of a single pile is determined by a load test, one of the following methods shall be used:

Method 1. It shall not exceed 50 percent of the yield point under test load. The yield point shall be defined as that point at which an increase in load produces a disproportionate increase in settlement.

Method 2. It shall not exceed one half of the load which causes a net settlement, after deducting rebound, of 0.01 inch per ton (0.000565 mm/N) of test load which has been applied for a period of at least 24 hours.

Method 3. It shall not exceed one half of that load under which, during a 40-hour period of continuous load application, no additional settlement takes place.

1807.5 Column Action. All piles standing unbraced in air, water or material not capable of lateral support, shall conform with the applicable column formula as specified in this code. Such piles driven into firm ground may be considered fixed and laterally supported at 5 feet (1524 mm) below the ground surface and in soft material at 10 feet (3048 mm) below the ground surface unless otherwise prescribed by the building official after a foundation investigation by an approved agency.

1807.6 Group Action. Consideration shall be given to the reduction of allowable pile load when piles are placed in groups. Where soil conditions make such load reductions advisable or necessary, the allowable axial load determined for a single pile shall be reduced by any rational method or formula approved by the building official.

1807.7 Piles in Subsiding Areas. Where piles are driven through subsiding fills or other subsiding strata and derive support from underlying firmer materials, consideration shall be given to the downward frictional forces which may be imposed on the piles by the subsiding upper strata.

Where the influence of subsiding fills is considered as imposing loads on the pile, the allowable stresses specified in this chapter may be increased if satisfactory substantiating data are submitted.

1807.8 Jetting. Jetting shall not be used except where and as specifically permitted by the building official. When used, jetting shall be carried out in such a manner that the carrying capacity of existing piles and structures shall not be impaired. After withdrawal of the jet, piles shall be driven down until the required resistance is obtained.

1807.9 Protection of Pile Materials. Where the boring records of site conditions indicate possible deleterious action on pile materials because of soil constituents, changing water levels or other factors, such materials shall be adequately protected by methods or processes approved by the building official. The effectiveness of such methods or processes for the particular purpose shall have been thoroughly established by satisfactory service records or other evidence which demonstrates the effectiveness of such protective measures.

1807.10 Allowable Loads. The allowable loads based on soil conditions shall be established in accordance with Section 1807.

> **EXCEPTION:** Any uncased cast-in-place pile may be assumed to develop a frictional resistance equal to one sixth of the bearing value of the soil material at minimum depth as set forth in Table 18-I-A but not to exceed 500 pounds per square foot (24 kPa) unless a greater value is allowed by the building official after a soil investigation as specified in Section 1804 is submitted. Frictional resistance and bearing resistance shall not be assumed to act simultaneously unless recommended after a foundation investigation as specified in Section 1804.

1807.11 Use of Higher Allowable Pile Stresses. Allowable compressive stresses greater than those specified in Section 1808 shall be permitted when substantiating data justifying such higher stresses are submitted to and approved by the building official. Such substantiating data shall include a foundation investigation including a report in accordance with Section 1807.1 by a soils en-

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gineer defined as a civil engineer experienced and knowledgeable in the practice of soils engineering.

SECTION 1808 — SPECIFIC PILE REQUIREMENTS

1808.1 Round Wood Piles.

1808.1.1 Material. Except where untreated piles are permitted, wood piles shall be pressure treated. Untreated piles may be used only when it has been established that the cutoff will be below lowest groundwater level assumed to exist during the life of the structure.

1808.1.2 Allowable stresses. The allowable unit stresses for round wood piles shall not exceed those set forth in Chapter 23, Division III, Part I.

The allowable values listed in Chapter 23, Division III, Part I, for compression parallel to the grain at extreme fiber in bending are based on load sharing as occurs in a pile cluster. For piles which support their own specific load, a safety factor of 1.25 shall be applied to compression parallel to the grain values and 1.30 to extreme fiber in bending values.

1808.2 Uncased Cast-in-place Concrete Piles.

1808.2.1 Material. Concrete piles cast in place against earth in drilled or bored holes shall be made in such a manner as to ensure the exclusion of any foreign matter and to secure a full-sized shaft. The length of such pile shall be limited to not more than 30 times the average diameter. Concrete shall have a specified compressive strength f'_c of not less than 2,500 psi (17.24 MPa).

> **EXCEPTION:** The length of pile may exceed 30 times the diameter provided the design and installation of the pile foundation is in accordance with an approved investigation report.

1808.2.2 Allowable stresses. The allowable compressive stress in the concrete shall not exceed $0.33f'_c$. The allowable compressive stress of reinforcement shall not exceed 34 percent of the yield strength of the steel or 25,500 psi (175.7 MPa).

1808.3 Metal-cased Concrete Piles.

1808.3.1 Material. Concrete used in metal-cased concrete piles shall have a specified compressive strength f'_c of not less than 2,500 psi (17.24 MPa).

1808.3.2 Installation. Every metal casing for a concrete pile shall have a sealed tip with a diameter of not less than 8 inches (203 mm).

Concrete piles cast in place in metal shells shall have shells driven for their full length in contact with the surrounding soil and left permanently in place. The shells shall be sufficiently strong to resist collapse and sufficiently watertight to exclude water and foreign material during the placing of concrete.

Piles shall be driven in such order and with such spacing as to ensure against distortion of or injury to piles already in place. No pile shall be driven within four and one-half average pile diameters of a pile filled with concrete less than 24 hours old unless approved by the building official.

1808.3.3 Allowable stresses. Allowable stresses shall not exceed the values specified in Section 1808.2.2, except that the allowable concrete stress may be increased to a maximum value of $0.40f'_c$ for that portion of the pile meeting the following conditions:

1. The thickness of the metal casing is not less than 0.068 inch (1.73 mm) (No. 14 carbon sheet steel gage).

2. The casing is seamless or is provided with seams of equal strength and is of a configuration that will provide confinement to the cast-in-place concrete.

3. The specified compressive strength f'_c shall not exceed 5,000 psi (34.47 MPa) and the ratio of steel minimum specified yield strength f_y to concrete specified compressive strength f'_c shall not be less than 6.

4. The pile diameter is not greater than 16 inches (406 mm).

1808.4 Precast Concrete Piles.

1808.4.1 Materials. Precast concrete piles shall have a specified compressive strength f'_c of not less than 3,000 psi (20.68 MPa), and shall develop a compressive strength of not less than 3,000 psi (20.68 MPa) before driving.

1808.4.2 Reinforcement ties. The longitudinal reinforcement in driven precast concrete piles shall be laterally tied with steel ties or wire spirals. Ties and spirals shall not be spaced more than 3 inches (76 mm) apart, center to center, for a distance of 2 feet (610 mm) from the ends and not more than 8 inches (203 mm) elsewhere. The gage of ties and spirals shall be as follows:

For piles having a diameter of 16 inches (406 mm) or less, wire shall not be smaller than 0.22 inch (5.6 mm) (No. 5 B.W. gage).

For piles having a diameter of more than 16 inches (406 mm) and less than 20 inches (508 mm), wire shall not be smaller than 0.238 inch (6.0 mm) (No. 4 B.W. gage).

For piles having a diameter of 20 inches (508 mm) and larger, wire shall not be smaller than $^1/_4$ inch (6.4 mm) round or 0.259 inch (6.6 mm) (No. 3 B.W. gage).

1808.4.3 Allowable stresses. Precast concrete piling shall be designed to resist stresses induced by handling and driving as well as by loads. The allowable stresses shall not exceed the values specified in Section 1808.2.2.

1808.5 Precast Prestressed Concrete Piles (Pretensioned).

1808.5.1 Materials. Precast prestressed concrete piles shall have a specified compressive strength f'_c of not less than 5,000 psi (34.48 MPa) and shall develop a compressive strength of not less than 4,000 psi (27.58 MPa) before driving.

1808.5.2 Reinforcement. The longitudinal reinforcement shall be high-tensile seven-wire strand. Longitudinal reinforcement shall be laterally tied with steel ties or wire spirals.

Ties or spiral reinforcement shall not be spaced more than 3 inches (76 mm) apart, center to center, for a distance of 2 feet (610 mm) from the ends and not more than 8 inches (203 mm) elsewhere.

At each end of the pile, the first five ties or spirals shall be spaced 1 inch (25 mm) center to center.

For piles having a diameter of 24 inches (610 mm) or less, wire shall not be smaller than 0.22 inch (5.6 mm) (No. 5 B.W. gage). For piles having a diameter greater than 24 inches (610 mm) but less than 36 inches (914 mm), wire shall not be smaller than 0.238 inch (6.0 mm) (No. 4 B.W. gage). For piles having a diameter greater than 36 inches (914 mm), wire shall not be smaller than $^1/_4$ inch (6.4 mm) round or 0.259 inch (6.6 mm) (No. 3 B.W. gage).

1808.5.3 Allowable stresses. Precast prestressed piling shall be designed to resist stresses induced by handling and driving as well as by loads. The effective prestress in the pile shall not be less than 400 psi (2.76 MPa) for piles up to 30 feet (9144 mm) in length, 550 psi (3.79 MPa) for piles up to 50 feet (15 240 mm) in length, and 700 psi (4.83 MPa) for piles greater than 50 feet (15 240 mm) in length.

7

The compressive stress in the concrete due to externally applied load shall not exceed:

$$f_c = 0.33f'_c - 0.27fp_c$$

WHERE:

fp_c = effective prestress stress on the gross section.

Effective prestress shall be based on an assumed loss of 30,000 psi (206.85 MPa) in the prestressing steel. The allowable stress in the prestressing steel shall not exceed the values specified in Section 1918.

1808.6 Structural Steel Piles.

1808.6.1 Material. Structural steel piles, steel pipe piles and fully welded steel piles fabricated from plates shall conform to UBC Standard 22-1 and be identified in accordance with Section 2202.2.

1808.6.2 Allowable stresses. The allowable axial stresses shall not exceed 0.35 of the minimum specified yield strength F_y or 12,600 psi (86.88 MPa), whichever is less.

> **EXCEPTION:** When justified in accordance with Section 1807.11, the allowable axial stress may be increased above 12,600 psi (86.88 MPa) and $0.35F_y$, but shall not exceed $0.5F_y$.

1808.6.3 Minimum dimensions. Sections of driven H-piles shall comply with the following:

1. The flange projection shall not exceed 14 times the minimum thickness of metal in either the flange or the web, and the flange widths shall not be less than 80 percent of the depth of the section.

2. The nominal depth in the direction of the web shall not be less than 8 inches (203 mm).

3. Flanges and webs shall have a minimum nominal thickness of $^3/_8$ inch (9.5 mm).

Sections of driven pipe piles shall have an outside diameter of not less than 10 inches (254 mm) and a minimum thickness of not less than $^1/_4$ inch (6.4 mm).

1808.7 Concrete-filled Steel Pipe Piles.

1808.7.1 Material. The concrete-filled steel pipe piles shall conform to UBC Standard 22-1 and shall be identified in accordance with Section 2202.2. The concrete-filled steel pipe piles shall have a specified compressive strength f'_c of not less than 2,500 psi (17.24 MPa).

1808.7.2 Allowable stresses. The allowable axial stresses shall not exceed 0.35 of the minimum specified yield strength F_y of the steel plus 0.33 of the specified compressive strength f'_c of concrete, provided F_y shall not be assumed greater than 36,000 psi (248.22 MPa) for computational purposes.

> **EXCEPTION:** When justified in accordance with Section 2807.11, the allowable stresses may be increased to $0.50\,F_y$.

1808.7.3 Minimum dimensions. Driven piles of uniform section shall have a nominal outside diameter of not less than 8 inches (203 mm).

SECTION 1809 — FOUNDATION CONSTRUCTION—SEISMIC ZONES 3 AND 4

1809.1 General. In Seismic Zones 3 and 4 the further requirements of this section shall apply to the design and construction of foundations, foundation components and the connection of superstructure elements thereto.

1809.2 Soil Capacity. The foundation shall be capable of transmitting the design base shear and overturning forces prescribed in Section 1630 from the structure into the supporting soil. The short-term dynamic nature of the loads may be taken into account in establishing the soil properties.

1809.3 Superstructure-to-Foundation Connection. The connection of superstructure elements to the foundation shall be adequate to transmit to the foundation the forces for which the elements were required to be designed.

1809.4 Foundation-Soil Interface. For regular buildings, the force F_t as provided in Section 1630.5 may be omitted when determining the overturning moment to be resisted at the foundation-soil interface.

1809.5 Special Requirements for Piles and Caissons.

1809.5.1 General. Piles, caissons and caps shall be designed according to the provisions of Section 1603, including the effects of lateral displacements. Special detailing requirements as described in Section 1809.5.2 shall apply for a length of piles equal to 120 percent of the flexural length. Flexural length shall be considered as a length of pile from the first point of zero lateral deflection to the underside of the pile cap or grade beam.

1809.5.2 Steel piles, nonprestressed concrete piles and prestressed concrete piles.

1809.5.2.1 Steel piles. Piles shall conform to width-thickness ratios of stiffened, unstiffened and tubular compression elements as shown in Chapter 22, Division VIII.

1809.5.2.2 Nonprestressed concrete piles. Piles shall have transverse reinforcement meeting the requirements of Section 1921.4.

> **EXCEPTION:** Transverse reinforcement need not exceed the amount determined by Formula (21-2) in Section 1921.4.4.1 for spiral or circular hoop reinforcement or by Formula (21-4) in Section 1921.4.4.1 for rectangular hoop reinforcement.

1809.5.2.3 Prestressed concrete piles. Piles shall have a minimum volumetric ratio of spiral reinforcement no less than 0.021 for 14-inch (356 mm) square and smaller piles, and 0.012 for 24-inch (610 mm) square and larger piles unless a smaller value can be justified by rational analysis. Interpolation may be used between the specified ratios for intermediate sizes.

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TABLE 18-I-A—ALLOWABLE FOUNDATION AND LATERAL PRESSURE

CLASS OF MATERIALS[1]	ALLOWABLE FOUNDATION PRESSURE (psf)[2] × 0.0479 for kPa	LATERAL BEARING LBS./SQ./FT./FT. OF DEPTH BELOW NATURAL GRADE[3] × 0.157 for kPa per meter	LATERAL SLIDING[4] Coefficient[5]	LATERAL SLIDING[4] Resistance (psf)[6] × 0.0479 for kPa
1. Massive crystalline bedrock	4,000	1,200	0.70	
2. Sedimentary and foliated rock	2,000	400	0.35	
3. Sandy gravel and/or gravel (GW and GP)	2,000	200	0.35	
4. Sand, silty sand, clayey sand, silty gravel and clayey gravel (SW, SP, SM, SC, GM and GC)	1,500	150	0.25	
5. Clay, sandy clay, silty clay and clayey silt (CL, ML, MH and CH)	1,000[7]	100		130

[1]For soil classifications OL, OH and PT (i.e., organic clays and peat), a foundation investigation shall be required.
[2]All values of allowable foundation pressure are for footings having a minimum width of 12 inches (305 mm) and a minimum depth of 12 inches (305 mm) into natural grade. Except as in Footnote 7, an increase of 20 percent shall be allowed for each additional foot (305 mm) of width or depth to a maximum value of three times the designated value. Additionally, an increase of one third shall be permitted when considering load combinations, including wind or earthquake loads, as permitted by Section 1612.3.2.
[3]May be increased the amount of the designated value for each additional foot (305 mm) of depth to a maximum of 15 times the designated value. Isolated poles for uses such as flagpoles or signs and poles used to support buildings that are not adversely affected by a $^1/_2$-inch (12.7 mm) motion at ground surface due to short-term lateral loads may be designed using lateral bearing values equal to two times the tabulated values.
[4]Lateral bearing and lateral sliding resistance may be combined.
[5]Coefficient to be multiplied by the dead load.
[6]Lateral sliding resistance value to be multiplied by the contact area. In no case shall the lateral sliding resistance exceed one half the dead load.
[7]No increase for width is allowed.

TABLE 18-I-B—CLASSIFICATION OF EXPANSIVE SOIL

EXPANSION INDEX	POTENTIAL EXPANSION
0-20	Very low
21-50	Low
51-90	Medium
91-130	High
Above 130	Very high

TABLE 18-I-C—FOUNDATIONS FOR STUD BEARING WALLS—MINIMUM REQUIREMENTS[1,2,3,4]

NUMBER OF FLOORS SUPPORTED BY THE FOUNDATION[5]	THICKNESS OF FOUNDATION WALL (inches) × 25.4 for mm: Concrete	THICKNESS OF FOUNDATION WALL (inches) × 25.4 for mm: Unit Masonry	WIDTH OF FOOTING (inches) × 25.4 for mm	THICKNESS OF FOOTING (inches) × 25.4 for mm	DEPTH BELOW UNDISTURBED GROUND SURFACE (inches) × 25.4 for mm
1	6	6	12	6	12
2	8	8	15	7	18
3	10	10	18	8	24

[1]Where unusual conditions or frost conditions are found, footings and foundations shall be as required in Section 1806.1.
[2]The ground under the floor may be excavated to the elevation of the top of the footing.
[3]Interior stud bearing walls may be supported by isolated footings. The footing width and length shall be twice the width shown in this table and the footings shall be spaced not more than 6 feet (1829 mm) on center.
[4]In Seismic Zone 4, continuous footings shall be provided with a minimum of one No. 4 bar top and bottom.
[5]Foundations may support a roof in addition to the stipulated number of floors. Foundations supporting roofs only shall be as required for supporting one floor.

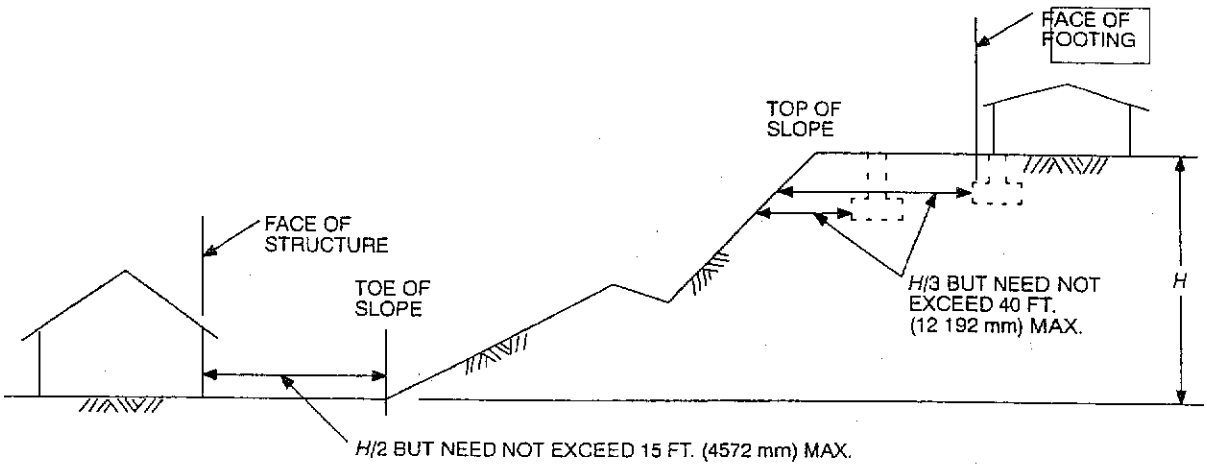
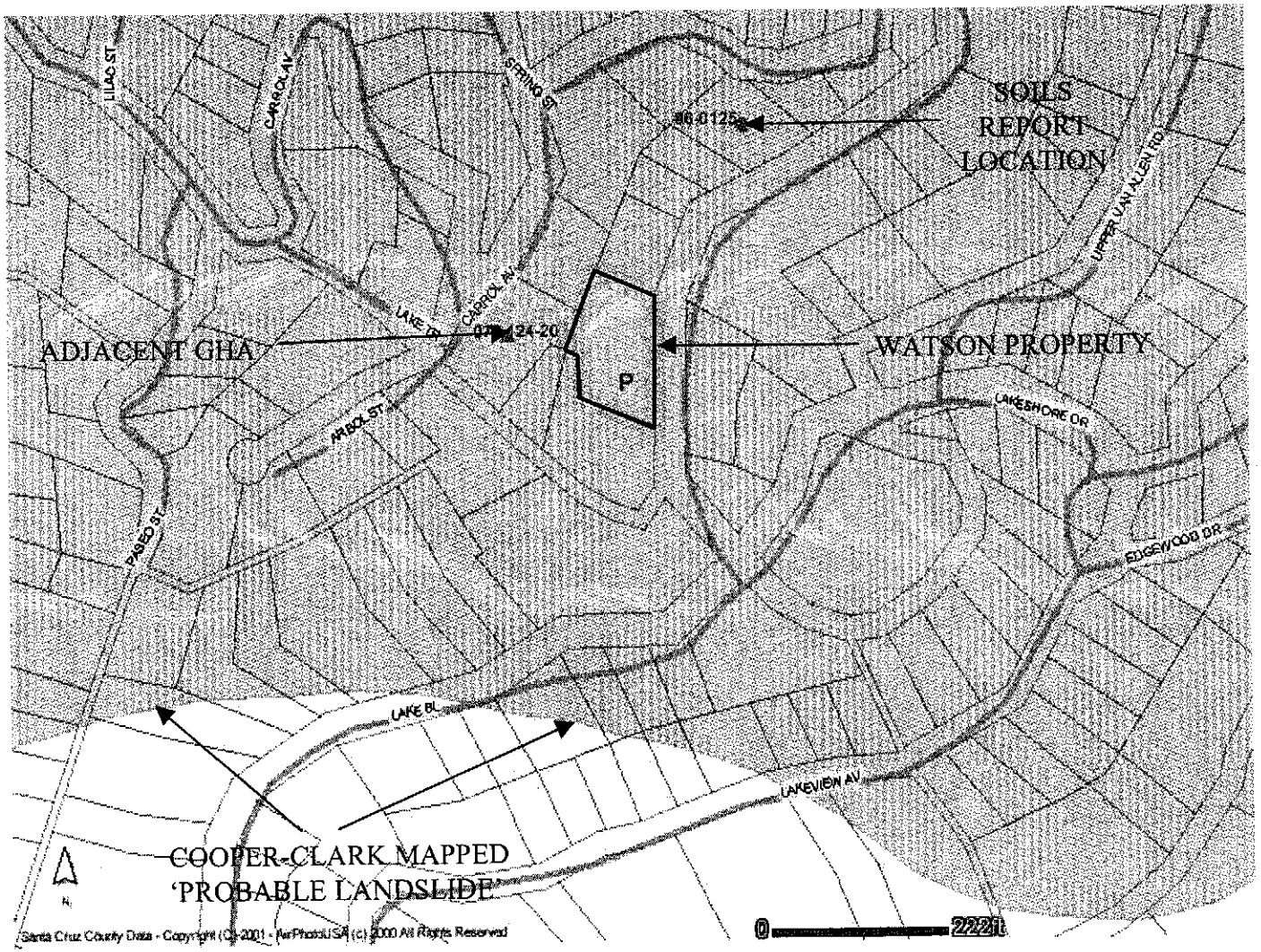


FIGURE 18-I-1—SETBACK DIMENSIONS

ATTACHMENT 5

Location Map Showing Adjacent Studies and Landslide Limits



PLANNING DEPARTMENT

COUNTY OF SANTA CRUZ

GOVERNMENTAL CENTER

701 OCEAN STREET SANTA CRUZ, CALIFORNIA 95060

Field Date: 12 APRIL 1990
Owner: TAROYA

APN: 075-124-19
Project Location and Address: ARBOL & CARROL LOMPICO

Permit #: 90-0391
Type of Permit: EH1

Geologic Hazards Assessment

The Geologic Hazards Ordinance (Chapter 16.10) requires evaluation of development to minimize the loss of life, injury and damage due to geologic hazards such as earthquakes, floods, and landslides.

This letter is designed to provide you with preliminary information about the geologic conditions that may affect your homesite. It is based on visual inspection and a review of maps on file with the Planning Department. The scope of this assessment is not intended to be as detailed as a full geologic or geotechnical report which a state-registered geologist and/or soils engineer completes. If detailed geologic or geotechnical investigation by a private, registered consulting geologist and/or soils engineer is required prior to issuance of any building permit, this will be indicated in section number13, "Follow-up Investigation Requirements".

1. Is the property located within one of the following mapped hazard areas? (If yes, see attached map)

Yes	No	
____	✓	State designated fault zone (Alquist-Priolo Special Study Zone).
____	✓	Mapped fault trace through or within 150' of the homesite (from the Seismic Safety Element fault map, Hall et al, 1974). ____
____	✓	Flood Hazard area as designated by FEMA.
✓	____	Mapped landslide (from Cooper, Clark, et al, 1975). ENTIRE PARCEL W/IN COOPER-CLARK MAPPED 'PROBABLE' LANDSLIDE
____	✓	Mapped feature from 1989 earthquake.

Mailing Address: 4405 CONCERTO DR., SAN JOSE, CA 95111

ATTACHMENT 6

2. Indicate the geologic material on the site (bedrock lithology and/or surface material). Note bedrock attitude where available.

THE SUBJECT PARCEL IS PREDOMINANTLY UNDERLAIN BY COLLUVIUM. THE MAPPED LITHOLOGY IS PROBABLY MONTEREY FORMATION (BRABB, et. al., 1970, 1989), BUT MAY BE LOMPICO SAND (FORMATIONAL CONTACT MAPPED VERY CLOSE TO PARCEL). ONLY COLLUVIUM WAS EVIDENT DURING FIELD VISIT.

3. Fissures and other ground damage from October 17, 1989 earthquake:

NONE EVIDENT ON PARCEL. DEVELOPMENT ON PARCELS SITUATED IMMEDIATELY WEST AND SOUTHWEST OF THE SUBJECT PARCEL SUSTAINED SEVERE SEISMIC SHAKING DAMAGE RESULTING FROM THE 17 OCT. EVENT.

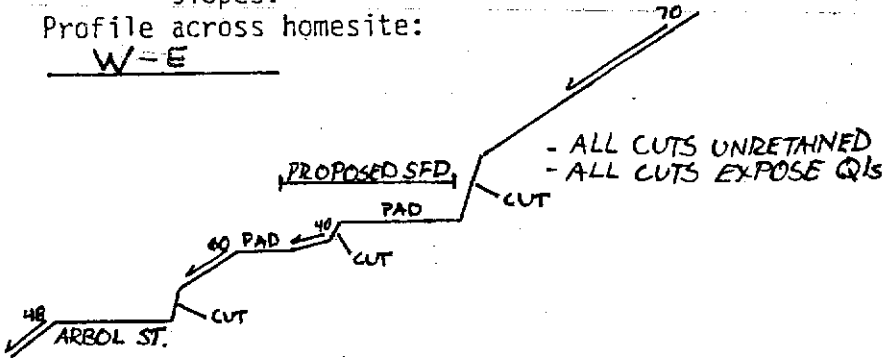
Yes	No	
_____	_____	are within 30 feet of the existing or proposed habitable structure.
_____	_____	are located in fill.
_____	_____	are forming arcuate patterns which could be related to landslide potential.
_____	_____	are located on ridge tops.
_____	_____	could cause a potential slope stability problem.
_____	_____	houses are located below the slope with fissures.

Describe Fissures (size, length, number, location):

N/A

4. Slope

LEVEL GRADED PAD.
____ % average gradient of pregraded homesite.
64 % maximum gradient above or below homesite; ~15' distance to slopes.
Profile across homesite:
W-E



5. Topographic position:

____	ridge top	✓	on a hillside
____	nose of minor ridge on slope	____	at base of hillside
____	swale or channel on slope	____	flood plain
____	_____		

6. General description of topography in homesite area:

THE PROPOSED HOMESITE OCCUPIES A HILLSIDE LOCATION AND IS FLANKED BY STEEP SLOPES ABOVE THE SITE (48%-70%), AND MODERATE TO STEEP SLOPES BELOW (35%-46%). THE DEVELOPMENT PAD IS TERRACED AND ABUTS SUBSTANTIAL CUT SLOPES ABOVE AND BELOW IT. CUTBANK RELIEF RANGES FROM 4' TO OVER 20' ON THE PARCEL.

7. The potential for debris flow, landslide, or rapid erosion exists to some degree at all hillside locations. Discuss the potential for these hazards at this location.

THE ENTIRE PARCEL IS SITUATED WITHIN A 'PROBABLE' COOPER-CLARK MAPPED LANDSLIDE. THE COLLUVIUM EXPOSED IN CUTS ADJACENT THE PAD AND CARROL ST. (BOTH ITS LATERAL EXTENT AND ITS INFERRED THICKNESS) SUPPORT THE EXISTENCE OF THE MAPPED FEATURE, AT LEAST AT AND ADJACENT THIS PARCEL. EXTENSIVE DOWNSLOPE ACTIVITY (PROBABLY JAN. '83 EVENT) IS EVIDENT SOUTH OF THE PARCEL (END OF ARBOL ST.). HUMMOCKY TOPOGRAPHY AND DISTORTED GROWTH PATTERNS IN REDWOODS ARE PREVALENT ON THE PARCEL. POSSIBLE DETACHMENT FEATURES AND ELONGATE BASINAL DEPRESSIONS ARE LIKELY EAST AND SOUTH OF THE PARCEL. THE POTENTIAL HAZARD FOR SLOPE FAILURE TO IMPACT DEVELOPMENT ON THIS PARCEL DURING THE EXPECTED LIFETIME OF THE STRUCTURE IS, IN A LIKELYHOOD, VERY HIGH AND NEEDS TO BE

8. Grading issues associated with this building site:

GRADING AT THE SITE HAS BEEN ACCOMPLISHED FOR THE PREVIOUS DWELLING. ADDITIONAL GRADING FOR THE PROPOSED HOME MUST BE MINIMIZED, AS EVEN MINOR GRADING AND EARTHWORK CAN AGGRAVATE SLOPE INSTABILITY. EVALUATE FOUNDATION DESIGN TO CONFORM TO EXISTING SITE CONDITIONS. CUT BANK, FILL BANK, AND PAD STABILITY MUST BE THOROUGHLY INVESTIGATED. ENGINEERED RETAINING STRUCTURE EMPLACEMENT OR INCORPORATION INTO FOUNDATION DESIGN IS WARRANTED.

9. Septic system location considerations:

SEPTIC SYSTEM MUST BE LOCATED WHERE IT WILL NOT CREATE OR EXACERBATE SLOPE INSTABILITY. APPROPRIATE SEPTIC SYSTEM SETBACK FROM PROBLEMATIC SLOPES IS INDICATED BY SITE CONDITIONS.

10. Access roadway problems:

NO ACCESS ROADWAY PROPOSED. SUITABILITY OF ENGINEERED RETAINING STRUCTURES ALONG CARROL AND ARBOL STREETS ADJACENT PROPOSED DEVELOPMENT IS APPROPRIATE.

11. Drainage and runoff considerations:

INCREASED RUNOFF RESULTING FROM DEVELOPMENT ACTIVITIES MAY AGGRAVATE SLOPE INSTABILITY. A DETAILED, ENGINEERED DRAINAGE PLAN SHOULD BE FORMULATED BY YOUR GEOTECHNICAL CONSULTANT REFLECTING THE FINDING OF THE REQUIRED GEOLOGIC REPORT.

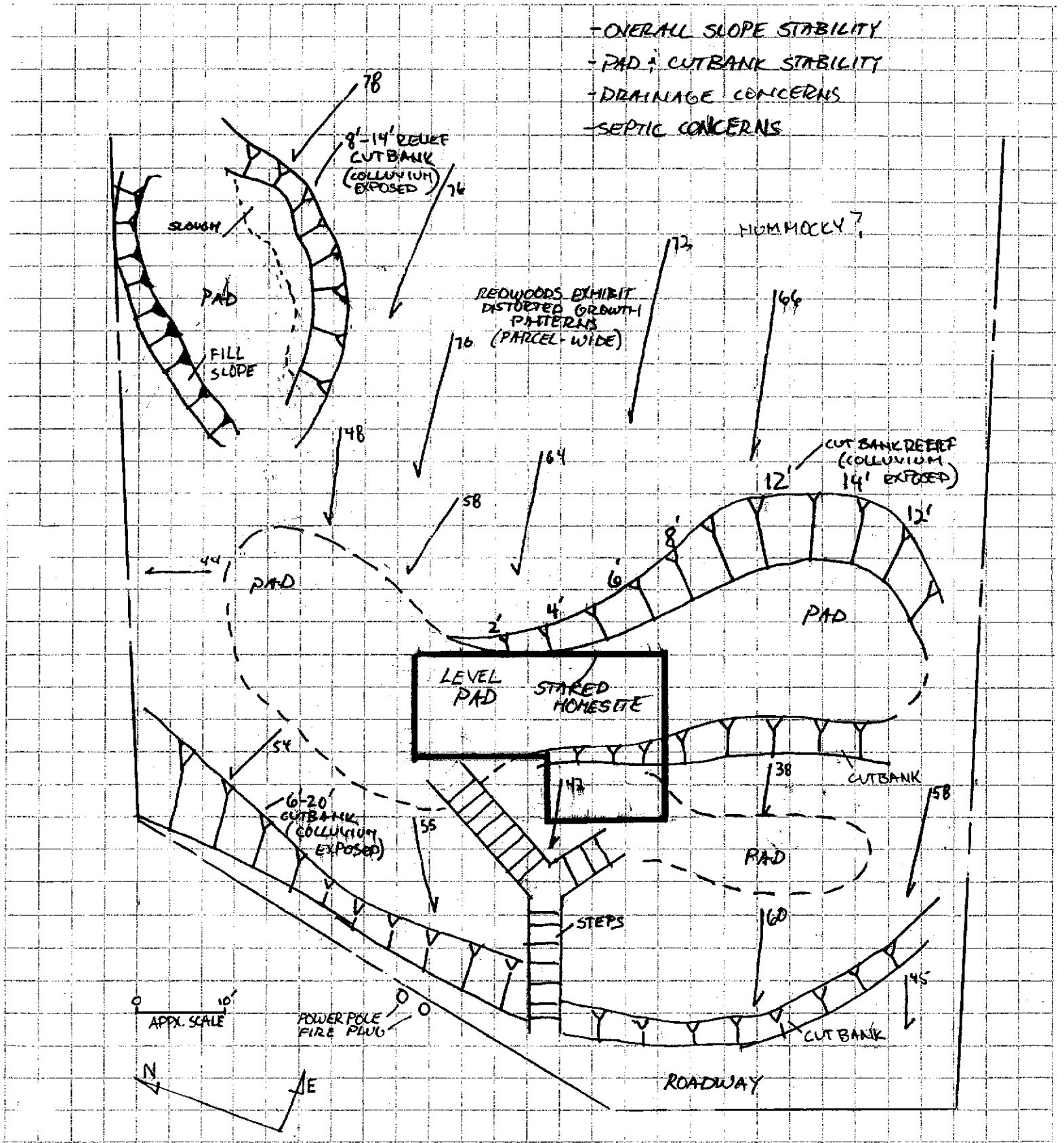
ITEM 12.

SKETCH MAP: PROPOSED TAFOYA HOMESITE

075-124-19

JR

12 APRIL 90



LEVEL PAD CORRESPONDS TO FORMER LOCATION OF SFD DESTROYED BY FIRE; SINCE ABATED

7

13. Follow-up investigation requirements for Permit # 90-0391 :

A. ✓ A geologic investigation completed by a state-registered geologist is required. The investigation should include but not necessarily be limited to the following concerns:

- RECENT SLOPE STABILITY AND THE POTENTIAL FOR RENEWED ACTIVITY OF HISTORICAL DOWNSLOPE FEATURES OCCURING ON THE PARCEL AS A WHOLE, AND AT THE HOMESITE IN PARTICULAR, INCLUDING, BUT NOT NECESSARILY LIMITED TO, THE LARGE-SCALE MAPPED LANDSLIDE FEATURE, THE LESSER FEATURES SOUTH OF THE PARCEL, THE SLOPES EAST OF THE HOMESITE, AND CUT AND FILL SLOPES ON THE PARCEL (ITEMS 2,6,7,8,10)
- DRAINAGE AND SEPTIC ISSUES RAISED IN ITEMS 9,11
- POTENTIAL FOR INTENSE SEISMIC SHAKING TO IMPACT DEVELOPMENT ON THIS PARCEL, AND SPECIFIC PARAMETERS FOR FOUNDATION DESIGN TO MINIMIZE THIS HAZARD.
- APPROPRIATE SETBACKS FROM GEOLOGIC HAZARDS AND ALTERNATE DESIGN CONFIGURATION OR DEVELOPMENT ENVELOPES, IF WARRANTED

Submit the completed investigation to the Zoning Counter (Rm. 400) and pay the $ 310.00 fee for Geologic Report Review.

B. ✓ A geotechnical (soils) investigation completed by a geotechnical engineer is required. The investigation should include but not necessarily be limited to the following concerns:

ADDRESS PERTINENT RECOMMENDATIONS AND CONCLUSIONS OF THE GEOLOGIC REPORT AND SPECIFICALLY ADDRESS SEPTIC, DRAINAGE, AND SLOPE STABILITY CONCERNS RAISED IN ITEMS 8,9,10, AND 11.

Submit the completed investigation to the Zoning Counter (Rm. 400) and pay the $ 140.00 fee for Geotechnical Report Review.

Permit conditions will be developed for you after your technical report(s) have been reviewed. At a minimum, however, you can expect a requirement to follow all the recommendations contained in the reports.

14. _____ No further professional reports are required to evaluate this homesite with respect to geologic hazards. Before your application for _____ is approved, the following conditions regarding geologic issues must be met:

1. Grading activities must be kept to a minimum.

2. Drainage from impermeable surfaces such as the roof and driveway must be collected and properly disposed of. Runoff should not be allowed to sheet off these areas on to the hillside below in an uncontrolled manner.

3. A Declaration form acknowledging a possible geologic hazard to the parcel must be completed prior to permit issuance.

____ Declaration attached concerning: _____

_____

15. ✓ Grading activities must be kept to a minimum.
SEE ITEM 8

✓ Drainage from impermeable surfaces such as the roof and driveway must be collected and properly disposed of. Runoff should not be allowed to sheet off these areas on to the hillside below in an uncontrolled manner.

This geologic hazards assessment must be made available to the geologic consultants and geotechnical engineers addressing the problems indicated in this assessment. Guidelines for geologic and geotechnical investigations, and a list of recommended geologic and geotechnical firms are enclosed.

Permit applications and building plans will be checked to verify that the project is consistent with the conditions outlined above prior to issuance of a building permit. If you have any questions regarding the hazards assessment for this parcel or geologic issues in general, please contact me at 458-7096.

Sincerely,

JOHN ROSENTHAL
NAME
Title GEOLOGIST

For: PETE PARKINSON
Environmental Coordinator/
Program Manager
Environmental & Technical Review

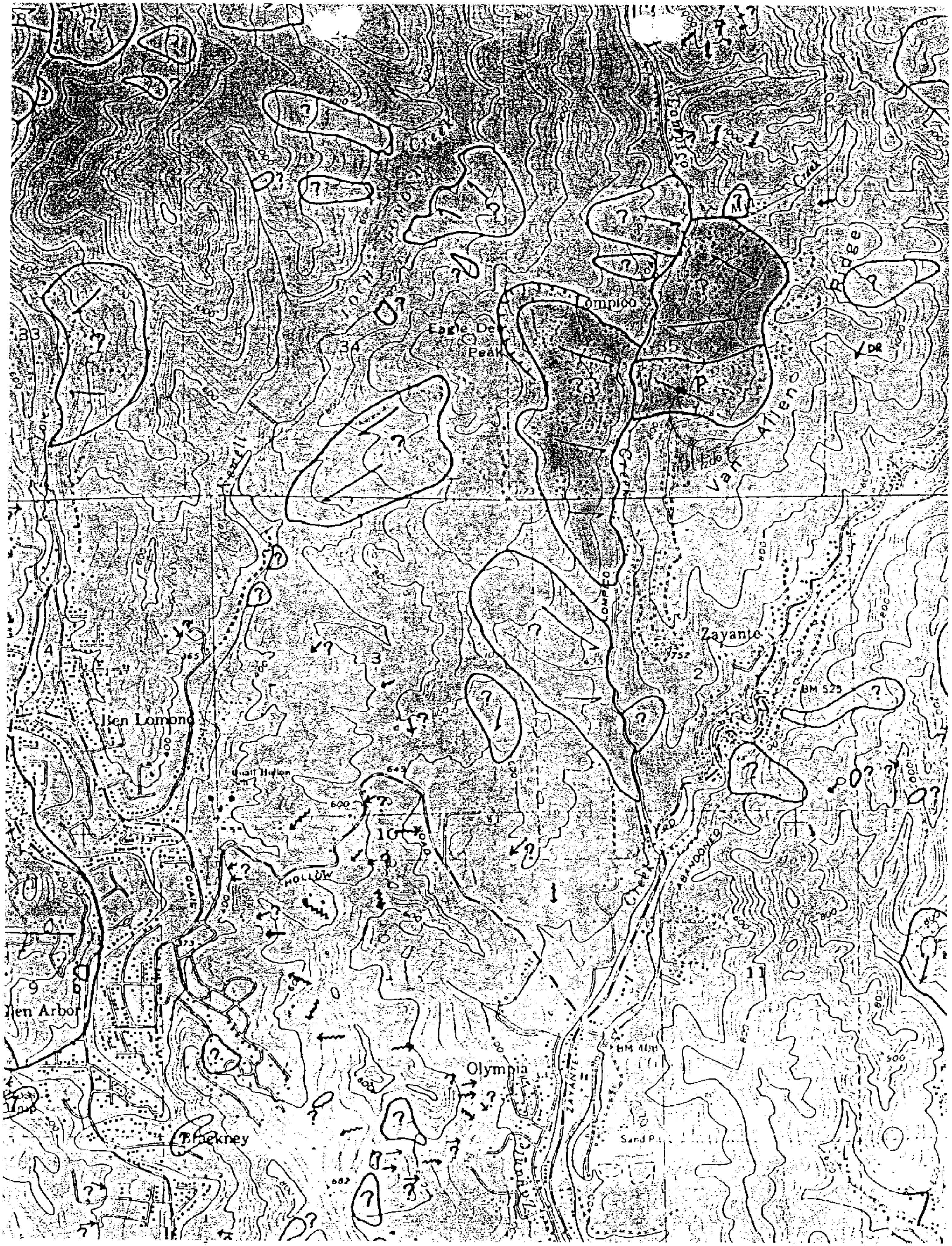
cc: Dieter Beermann
(Planner) CHRIS GIOVANNONI
Pat Gill

NOTE: THIS MAY BE AN EXISTING LOT OF RECORD WHERE A SUITABLE BUILDING SITE, FROM A GEOLOGIC HAZARDS STANDPOINT, MAY NOT EXIST.

SUBMITTING TECHNICAL REPORTS TO THE DEPT. DOES NOT INSURE THAT A SUITABLE SITE IS PRESENT, BUT ARE NEEDED TO AID IN THE DETERMINATION OF PARCEL SUITABILITY FOR DEVELOPMENT.

PLEASE DON'T HESITATE TO CALL ME IF YOU HAVE ANY QUESTIONS.

revised 2/28/90
quakegeo/816


Tompico
Eagle Deer Peak
Zayante
Ben Lomond
Ben Arbor
Olympia
Brackney
Van Allen Ridge
HOLLOW
QUAIL
ZAYANTE
BM 525
33
34
35
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9
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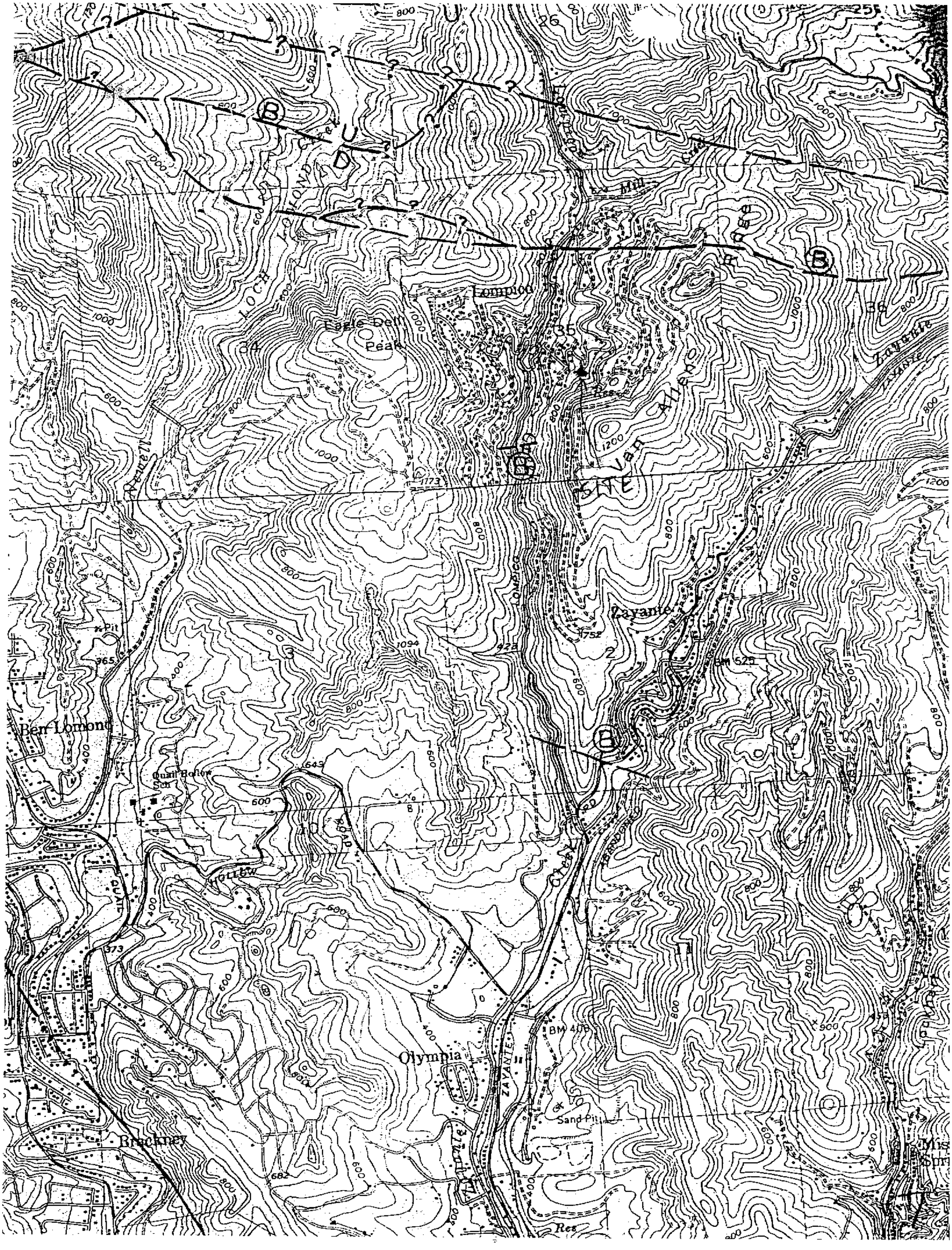

Lompico
Eagle Dell Peak
Zayante
Ben Lomond
Quail Hollow Sch
Olympia
Brackney
Sand Pit
BM 400
BM 625
SITE
Res

96-0125

075·124·04

GEOTECHNICAL INVESTIGATION
FOR
11677 LAKE BOULEVARD
FELTON, CALIFORNIA

FOR
SUSAN AND JOHN WILDER
FELTON, CALIFORNIA

BY
STEVEN RAAS & ASSOCIATES, INC.
CONSULTING GEOTECHNICAL ENGINEERS
9583-SZ25-E52
DECEMBER 1995

9583-SZ25-E52

esr

ATTACHMENT 7

9583-SZ25-E52
December 22, 1995

TABLE OF CONTENTS

Steven Raas & Associates, Inc.

CONSULTING GEOTECHNICAL ENGINEERS

444 AIRPORT BOULEVARD, SUITE 106 WATSONVILLE, CA 95076 (408) 722-9446 FAX (408) 722-9158

9583-SZ25-E52
December 22, 1995

Susan and John Wilder
11677 Lake Boulevard
Felton, CA 95018-9807

Subject: Focused Geotechnical Investigation
11677 Lake Boulevard
Felton, California

Dear Mr. and Ms. Wilder,

In accordance with your authorization, we have performed a focused geotechnical investigation for your project located in Felton, California.

The accompanying report presents our conclusions and recommendations as well as the results of the focused geotechnical investigation on which they are based. If you have any questions concerning the data, conclusions or recommendations presented in this report, please call our office.

Very truly yours,

STEVEN RAAS & ASSOCIATES, INC.

Daleth Foster
Senior Geologist

Steven M. Raas
Principal Engineer
G.E. 2039
Exp. 6/30/98

G:\USERS\DF\WORD\GR9583.DOC
Copies: 2 to Susan and John Wilder
1 to Mesiti-Miller Engineering, Attn: Bill Grizzell

9583-SZ25-E52
December 22, 1995

GEOTECHNICAL INVESTIGATION

PURPOSE AND SCOPE

This report describes the focused geotechnical investigation and presents results, including recommendations, for the proposed retaining walls. Our mutually agreed upon scope of services did not include an analysis of existing or potential geologic hazards which could affect the site. Our scope of services for this project has consisted of the tasks outlined below.

1. We met on site and discussed the project with Bill Grizzell and Carry Edmondson.
2. We reviewed pertinent published material concerning the site including geologic maps, Santa Cruz County landslide and fault hazard planning maps, site plans, and other available literature.
3. We performed a subsurface investigation which included the drilling and logging of 3 test borings.
4. Laboratory analysis was performed for samples collected at the site.
5. Engineering analysis of the field and laboratory results was performed.
6. We prepared this report documenting our investigation and presenting recommendations for the design of the project.

LOCATION AND DESCRIPTION

The site is located at 11677 Lake Boulevard in the Lompico area of Santa Cruz, California. The slopes on the site dip very steeply to the west in the direction of Lompico Creek approximately 200 feet below. A single family residence is located approximately 25 feet below Lake Boulevard. The steep slope between the road and the residence is retained with three approximately 7 foot tall wood retaining walls. All three retaining wall show signs of

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distress, and the middle wall has failed completely in a few areas. It is proposed to replace the failing retaining walls.

FIELD INVESTIGATION

Three 3 inch diameter test borings were drilled on the site on November ~~30, 1~~995. The drilling was performed with a mechanically operated portable rig with continuous flight augers. A geologist from Steven Raas & Associates, Inc., was present during the drilling operations to log the soil encountered and to choose soil sampling type and locations.

Relatively undisturbed soil samples were obtained at various depths by driving a split spoon sampler 18 inches into the ground. This was achieved by freely dropping a 70 pound down donut hammer from a vertical height of 30 inches. The number of blows needed to drive the sampler for each 6 inch portion is recorded and the total number of blows needed to drive the last 12 inches is reported as the Blow Count value. The outside diameter of the samplers used in this investigation was either 3 inches, 2½ inches, or 2 inches, and is noted respectively as "L", "M" or "T" on the boring logs. The Blow Count data has not been reduce and should not be construed for the Standard Penetration Test "N" value.

Appendix A contains the Site Plan showing the locations of the test borings and the Log of Test Borings presenting the soil profile explored in each boring, the sample locations, and the Blow Count values for each sample. Stratification lines on the boring logs are approximate as the actual transition between soil types may be gradual.

LABORATORY INVESTIGATION

The laboratory testing program was developed to help in evaluating the bearing capacity, settlement characteristics, swell potential for the soil on the site. Laboratory tests performed include:

a) Moisture Density relationships in accordance with ASTM test D2937.

b) Atterberg Limits tests in accordance with ASTM test D4318-84.

c) Gradation tests in accordance with ASTM test D422.

The results of the laboratory tests are presented on the boring logs opposite the sample tested.

SOIL CONDITIONS

The site is mapped as Tertiary Monterey Formation which consists of mudstone and silty sandstone (Brabb, 1989). The soil in the vicinity of the retaining walls consisted of approximately 8 to 10 feet of very loose to loose brownish yellow silty gravelly sand. Below a depth of approximately 8 to 10 feet, highly weathered sandy siltstone was encountered to the boring terminations at a maximum depth of approximately 16 1/2 feet. The soil was moist and no groundwater was encounter in any of the borings.

SEISMIC HAZARDS

Your property and the surrounding area is mapped as potentially being a massive landslide (Preliminary Map of Landslide Deposits in Santa Cruz County, CA, Cooper-Clark Associates). Additionally, your site is located approximately 2,000 feet south of the Zayante Fault Zone. As detailed in our mutually agreed upon scope of services, we did not include an analysis of existing or potential geologic hazards, including but not limited to landsliding and faulting, which could affect the site.

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DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

GENERAL

1. The results of our investigation indicate that from a geotechnical engineering standpoint the existing retaining walls may be replaced provided these recommendations are included in the design and construction of the project. An appropriate system to retain the slopes should consist of a retaining wall with a deep foundation, such as a soldier pile wall. Deep foundations are recommended for the site as the slopes on the site are very steep, and retaining walls founded in the upper stratum could loose bearing support due to slope creep or due to the failure of the highly fractured mudstone bedrock below the footings.

2. An appropriate system to retain the steep slopes on the site should include a deep foundation.

3. Grading and foundation plans should be reviewed by Steven Raas & Associates, Inc. during their preparation and prior to contract bidding.

4. Steven Raas & Associates, Inc. should be notified at least four (4) working days prior to any site clearing in order to observe the removal and disposal of any organically contaminated material and the existing wood retaining wall, and to coordinate this work with the grading contractor. During this period, a pre-construction conference should be held on the site, with at least the contractor, a county representative and one of our engineers present. At this time, the project specifications and the testing and inspection responsibilities will be outlined and discussed.

5. Field observation and testing must be provided by a representative of Steven Raas & Associates, Inc., to enable them to form an opinion as to the degree of conformance of the

exposed site conditions to those foreseen in this report, regarding the adequacy of the site preparation, the acceptability of fill materials, and the extent to which the earthwork construction and the degree of compaction comply with the specification requirements. Any work related to grading or foundation construction performed without the full knowledge of, and not under the direct observation of Steven Raas & Associates, Inc., the Geotechnical Engineer, will render the recommendations of this report invalid.

SITE PREPARATION AND RETAINING WALL RECOMMENDATIONS

6. The initial preparation of the site will consist of the removal of vegetation as required in the area of the retaining walls, removal of the existing wood retaining walls, and all associated debris. This contaminated soil and debris should be removed from the site. The required depth of stripping must be based on visual observations of Steven Raas & Associates, Inc. It is anticipated that the depth of striping may be 2 to 4 inches.

7. Following the removal of vegetation, the loose soil should be removed from the slope face. The extent of this soil removal will be designated by a representative of Steven Raas & Associates, Inc. in the field. This soil may or may not be adequate to use as backfill material behind the retaining structure. All material that is not acceptable for fill material should be removed from the construction site.

8. At the time we prepared this report, the retaining wall plans had not be completed and the wall location and construction details had not been finalized. We request an opportunity to review these items during the design stages to determine is supplemental recommendations will be required.

9. An appropriate system to retain the slopes will consist of a soldier pile wall with timber lagging. The soldier piles should be constructed of steel H beams founded in cast-in-place

concrete piers. The timber used as lagging should be preserved in accordance with CALTRANS Standard Specifications, Section 58.

10. The soldier pile retaining wall, with full drainage and horizontal backfill, should be designed using the following criteria:

a. Minimum pier embedment should be a minimum of 7 feet into the yellowish brown weathered sandy siltstone bedrock. Depending on the location and height of the wall on the slope, this may necessitate pier depths of approximately 10 to 20 feet. Actual depths could depend upon a lateral force analysis performed by your structural engineer.

b. Minimum pier size should be 18 inches in diameter and all pier holes must be free of loose material on the bottom.

c. When walls are free to yield an amount sufficient to develop the active earth pressure condition (about ½% of height), design for an active earth pressure of 35 psf/ft of depth for horizontal backfill, and 54 psf/ft of depth for backfill with a slope of 2:1 (horizontal to vertical). Should the slope behind the retaining walls be other than horizontal or 2:1 (horizontal to vertical), supplemental design criteria will be provided for the active earth or at rest pressures for the particular slope angle.

d. Passive pressures of 300 psf/ft of depth can be developed, acting over a plane 1½ times the pier diameter. Neglect passive pressure in the top 2 feet of embedment.

e. The resultant seismic force on the wall is 20 H^2 and acts at a point 0.6H up from the base of the wall.

f. If groundwater is present, the piers will need to be cased during drilling. If water is present, the water will either have to be pumped before the steel and concrete placement, or the concrete will have to be placed using a tremie. If the casing is pulled during the concrete pour, it must be pulled slowly with a minimum of 4 feet of casing remaining embedded within the concrete at all times. If concrete is placed via a tremie, the end of the tube must remain embedded a minimum of 4 feet into the concrete at all times.

g. Any live or dead loads which will transmit a force to the wall. Refer to Figure No. 7.

h. All pier construction must be observed by a representative of Steven Raas & Associates, Inc. Any piers constructed without the full knowledge and continuous observation of Steven Raas & Associates, Inc., will render the recommendations of this report invalid.

11. The piers should contain steel reinforcement as determined by the Project Structural Engineer.

12. The above criteria are based on fully drained conditions. Therefore, we recommend that permeable material meeting the State of California Standard Specification Section 68-1.025, Class 1, Type A, be placed behind the wall, with a minimum width of 12 inches and extending for the full height of the wall to within 1 foot of the ground surface. The rock should be covered with Mirafi 140 filter fabric or equivalent and then compacted native soil placed to the ground surface. A 4 inch diameter perforated rigid plastic or metal drain pipe should be installed within 3 inches of the bottom of the granular backfill and be to an approved location away from the footing area.

BACKFILL MATERIAL AND COMPACTION RECOMMENDATIONS

13. The backfill behind the retaining walls may be comprised of approved on site soil or of imported engineered fill.

14. Should the use of imported fill be necessary on this project, the fill material should be:

a. free of organics, debris, and other deleterious materials

b. granular in nature, well graded, and contain sufficient binder to allow trenches to stand open

c. free of rocks in excess of 2 inches in size

d. have a Plasticity Index between 4 and 12, and be non-expansive

e. have a minimum Sand Equivalent of 20

f. have a minimum Resistance "R" Value of 30

15. The backfill material should be compacted to a minimum of 90% of its maximum dry density. The moisture conditioning procedure will depend on the time of year that the work is done, but it should result in the soils being 1 to 3 percent over their optimum moisture content at the time of compaction.

Note: If this work is done during or soon after the rainy season, the on-site soils may be too wet to be used as engineered fill.

16. The maximum dry density will be obtained from a laboratory compaction curve run in accordance with ASTM Procedure #D1557-78. This test will also establish the optimum moisture content of the material. Field density testing will be in accordance with ASTM Test #D2922.

17. Samples of any proposed imported fill planned for use on this project should be submitted to Steven Raas & Associates, Inc. for appropriate testing and approval not less than 4 working days before the anticipated jobsite delivery.

SURFACE DRAINAGE AND EROSION CONTROL

18. All roof eaves should be guttered, with the outlets from the downspouts provided with adequate capacity to carry the storm water from the structures to reduce the possibility of soil saturation and erosion. The connection should be in a closed conduit which discharges at an approved location away from foundations.

19. Slopes should be constructed so that surface water will not be allowed to drain over the top of the retaining wall, or over the crest of exposed slopes. Concentrations of surface water

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runoff should be transported by paved ditches or other structures needed to carry the water to an appropriate discharge location.

20. Irrigation activities at the site should not be done in an uncontrolled or unreasonable manner.

PLAN REVIEW

21. We respectfully request an opportunity to review the plans during preparation and before bidding to insure that the recommendations of this report have been included and to provide additional recommendations, if needed.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The scope of this investigation was limited to address only the slopes in the retaining wall area. Existing and or potential geologic hazards, including but not limited to faulting and landsliding, were not part of our mutually agreed upon scope of services.

2. The recommendations of this report are based upon the assumption that the soil and bedrock conditions do not deviate from those disclosed in the borings. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that planned at the time, our firm should be notified so that supplemental recommendations can be given.

3. This report is issued with the understanding that it is the responsibility of the owner, or his representative, to insure that the information and recommendations contained herein are called to the attention of the Architects and Engineers for the project and incorporated into the plans, and that the necessary steps are taken to insure that the Contractors and Subcontractors carry out such recommendations in the field.

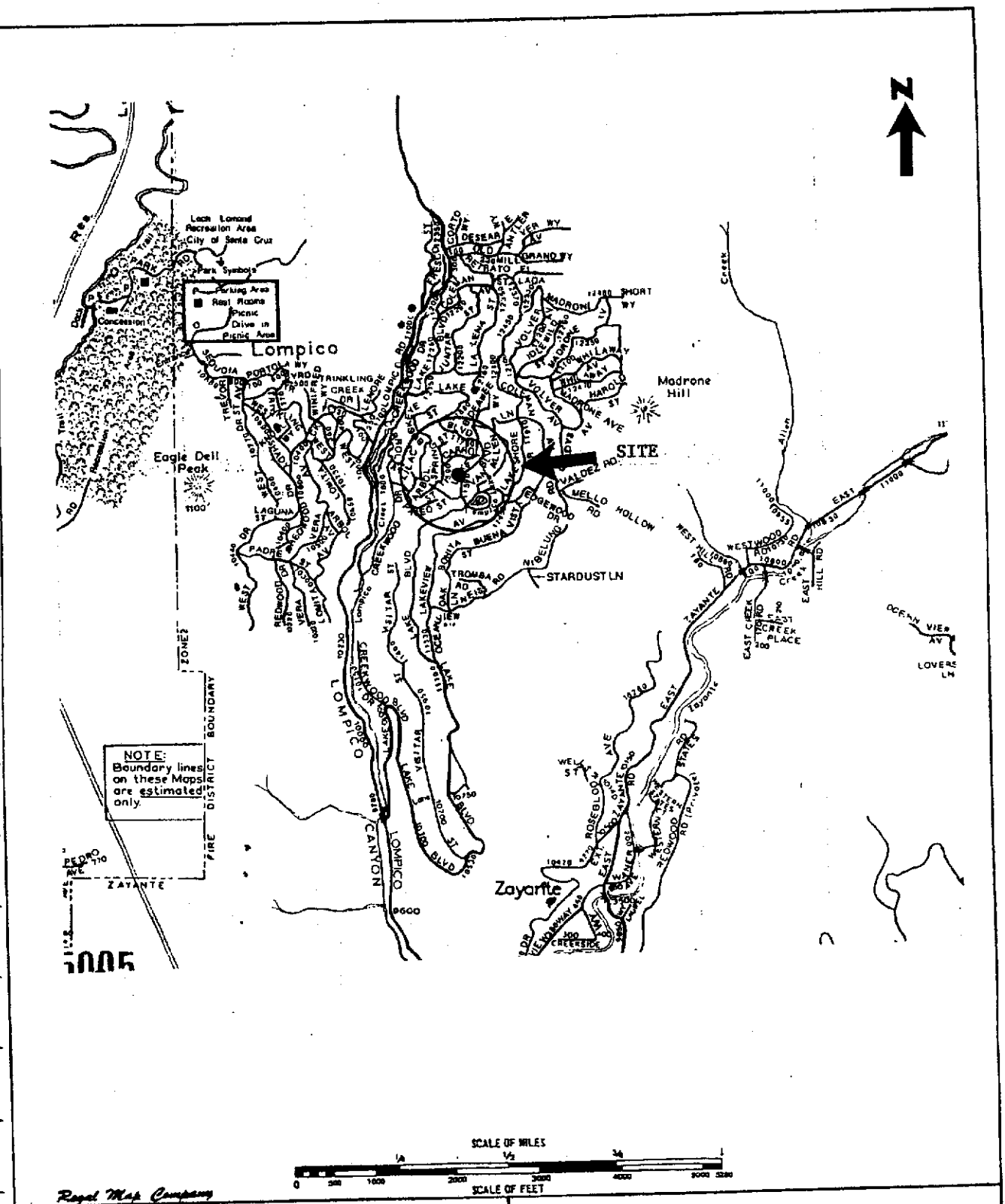
4. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural process or the works of man, on this or adjacent properties. In addition, changes in applicable or appropriate standards occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated, wholly or partially, by changes outside of our control. This report should therefore be reviewed in light of future planned construction and then current applicable codes.

5. This report was prepared upon your request for our services in accordance with currently accepted standards of professional geotechnical engineering practice. No warranty as to the contents of this report is intended, and none shall be inferred from the statements or opinions expressed.

6. The scope of our services mutually agreed upon for this project did not include any environmental assessment or study for the presence of hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site.

APPENDIX A

Regional Site Plan
Site Plan Showing Test Borings
Boring Log Explanation
Log of Test Borings
Surcharge Pressure Diagram



Steven Raas & Associates | FIGURE NO: 1 | Regional Site Plan

FORM NO. 2

WFP R-155

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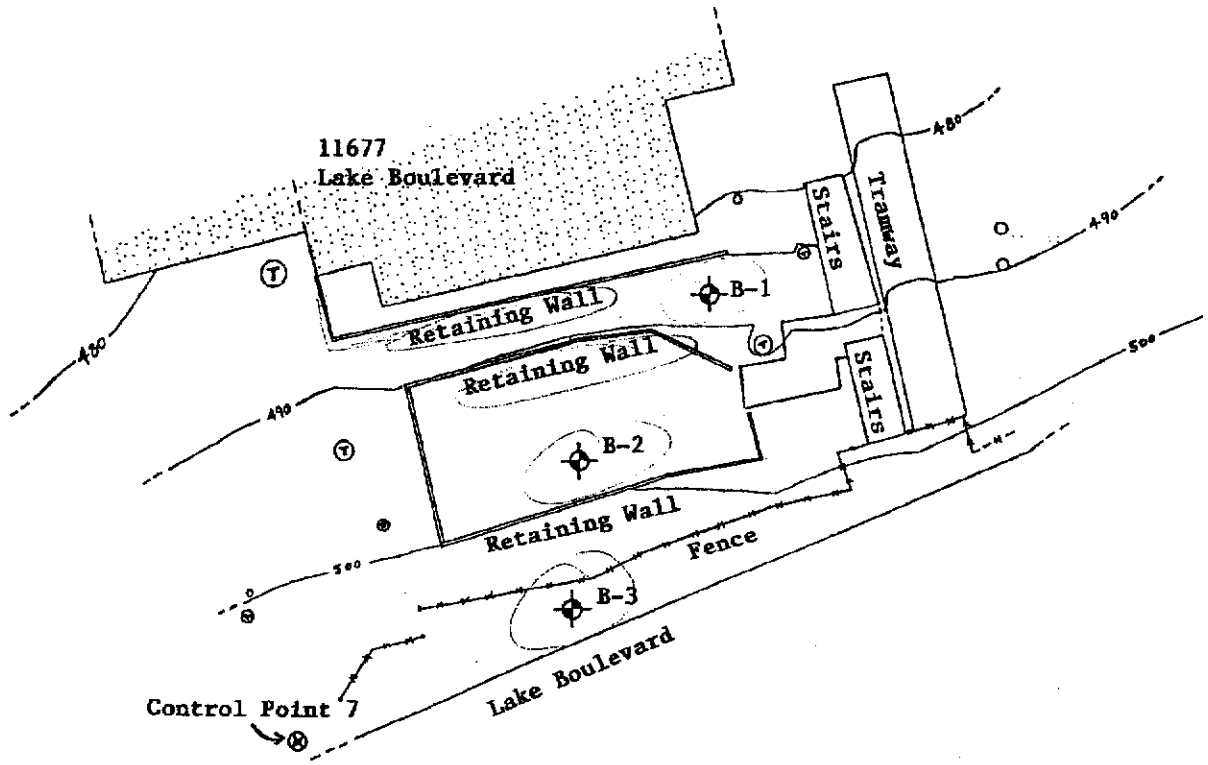

0 15 ft.

Tree

Location of Test Borings

Base Map from
Cary Edmundson

N

Steven Raas & Associates	FIGURE NO.: 2	Regional Site Plan

WFP 8-155

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UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D2488-84

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN #200 SIEVE SIZE	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN #4 SIEVE	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	Well graded gravels, gravel sand mixture, little or no fines.
			GP	Poorly graded gravels or gravels-sand mixtures, little or no fines.
		GRAVELS (MORE THAN 12% FINES)	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines.
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN #4 SIEVE	CLEAN SANDS (LESS THAN 5% FINES)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS (MORE THAN 12% FINES)	SM	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50%		ML	Inorganic silts and very fine clayey sand silty sands, with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly, sandy, silty or lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Organic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils

BORING LOG EXPLANATION

LOGGED BY_____ DATE DRILLED_____ BORING DIAMETER_____ BORING NO. _____

Depth, ft.	Sample No. and Type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	SPT "N" Value	Qu (t. s. f.) Penetrometer	Dry Density, p.c.f.	Moisture % of Dry Wt.	MISC. LAB RESULTS
1 2 3 4 5 6	1-1 L		← Soil Sample Number ← Soil Sampler Size/Type L = 3" Outside Diameter M = 2.5" Outside Diameter T = 2" Outside Diameter ST = Shelby Tube BAG = Bag Sample	Note: All blows/foot are normalized to 2" outside diameter sampler size					

RELATIVE DENSITY

SANDS AND GRAVELS	BLOWS/FOOT
VERY LOOSE	0-4
LOOSE	4-10
MEDIUM DENSE	10-30
DENSE	30-50
VERY DENSE	OVER 50

CONSISTENCY

SILTS AND CLAYS	BLOWS/FOOT
VERY SOFT	0-2
SOFT	2-4
FIRM	4-8
STIFF	8-16
VERY STIFF	16-32
HARD	OVER 32

Steven Raas & Associates, Inc. | FIGURE NO.: 3 Boring Log Explanation

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LOGGED BY DG DATE DRILLED 11/30/95 BORING DIAMETER 3"SS BORING NO. 1

Depth, ft.	Sample No. and Type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blow Counts	Qu (t. s. f.) Penetrometer	Dry Density, p.c.f.	Moisture % of Dry Wt.	MISC. LAB RESULTS
1			Brown Silty Gravelly SAND, fine to medium grained, angular gravel to > 2" of mudstone, roots, damp	SM					
2	1-1 M		Yellowish brown Silty Gravelly SAND, fine to medium grained, angular gravel to > 2 1/2" of mudstone, moist, very loose		7		55.7	31.9	49% Passing #200 Sieve
3									
4									
5	1-2 M		Light brownish yellow very Silty SAND, fine to very fine grained, frequent angular gravel to 1/2" of mudstone, moist, loose	SM	27		59.8	34.8	41% Passing #200 Sieve
6									
7									
8			Increased density at 8'						
9									
10	1-3 M		Brownish yellow Sandy MUDSTONE, very fine grained sand, moist, very dense		50/5"		60.5	40.7	
11									
12									
13			Increasing density						
14			Boring Terminated at 13'						
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

STEVEN RAAS & ASSOCIATES, INC.

FIGURE NO. 4 Log of Test Borings

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LOGGED BY DG DATE DRILLED 11/30/95 BORING DIAMETER 3"SS BORING NO. 2

Depth, ft.	Sample No. and Type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blow Counts	Qu (t. s. f.) Penetrometer	Dry Density, p.c.f.	Moisture % of Dry Wt.	MISC. LAB RESULTS
1-3			Pale brown Silty Gravelly SAND, fine to medium grained, angular gravel to 6" of mudstone, roots, damp, very loose	SM					
4-9	2-2 T		Brownish yellow very Silty SAND with gravel, very fine grained, angular gravel to 1 1/2" of mudstone, moist, medium dense	SM	22			39.4	27% Passing #200 Sieve
10-14	2-3 M		Brownish yellow Sandy MUDSTONE, partially weathered, iron oxide staining, moist, medium dense		70		61.2	42.8	
15-16	2-4 T		Yellowish brown Sandy MUDSTONE, moist, medium dense		61			39.9	
17-24			Boring Terminated at 16 1/2'						

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FIGURE NO. 5 Log of Test Borings

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LOGGED BY DG DATE DRILLED 11/30/95 BORING DIAMETER 3"SS BORING NO. 3

Depth, ft.	Sample No. and Type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blow Counts	Qu (t. s. f.) Penetrometer	Dry Density, p.c.f.	Moisture % of Dry Wt.	MISC. LAB RESULTS
1				SM					
2	3-1 L		Brownish yellow Silty Gravelly SAND, fine grained, angular gravel to 1" of mudstone, roots, damp, very loose		22			33.6	
3									
4			Caving soils from 4'-5'						
5									
6	3-2 L		Brownish yellow Gravelly Silty SAND, fine grained, angular gravel to > 2 1/2" of mudstone, damp, very loose		22		38.5	37.4	
7									
8									
9									
10	3-3 M		Yellowish brown Sandy MUDSTONE, very fine grained sand, moist, medium dense				56.1	38.8	
11									
12			Boring Terminated at 12'						
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

STEVEN RAAS & ASSOCIATES, INC.

FIGURE NO. 6 Log of Test Borings

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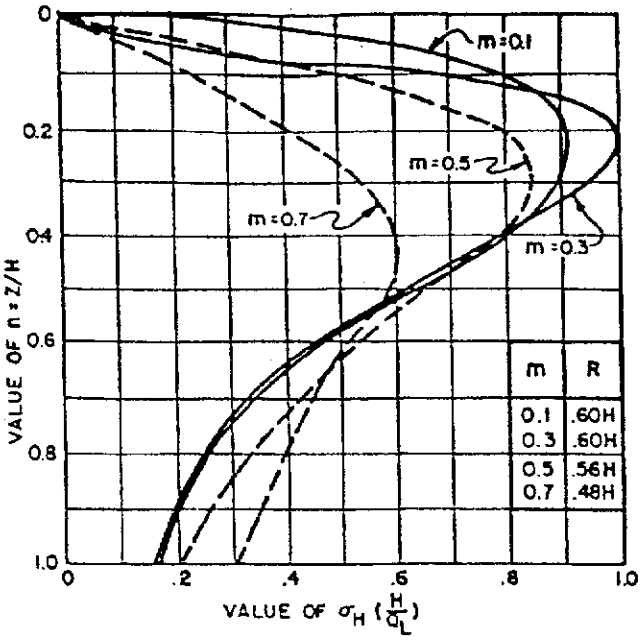
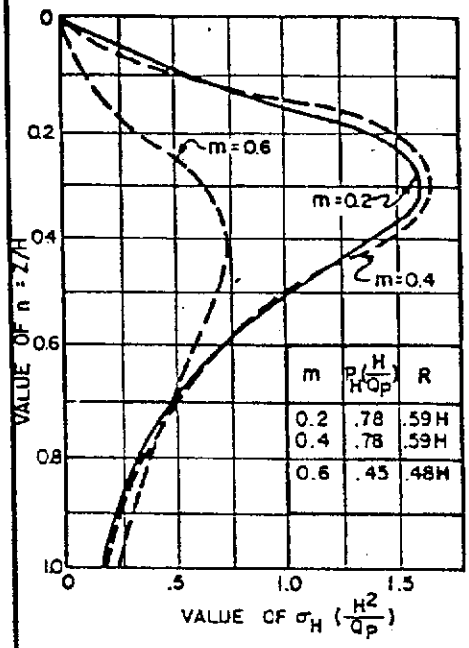
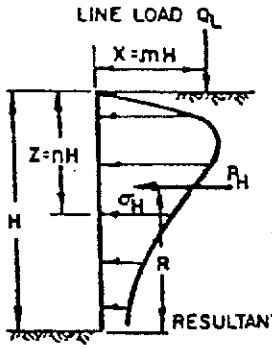


m	R
0.1	.60H
0.3	.60H
0.5	.56H
0.7	.48H



m	$P_H(\frac{H}{Q_P})$	R
0.2	.78	.59 H
0.4	.78	.59H
0.6	.45	.48H



FOR $m \leq 0.4$:

$$\sigma_H(\frac{H}{Q_L}) = \frac{0.20n}{(0.16+n^2)^2}$$

$$P_H = 0.55 Q_L$$

FOR $m > 0.4$:

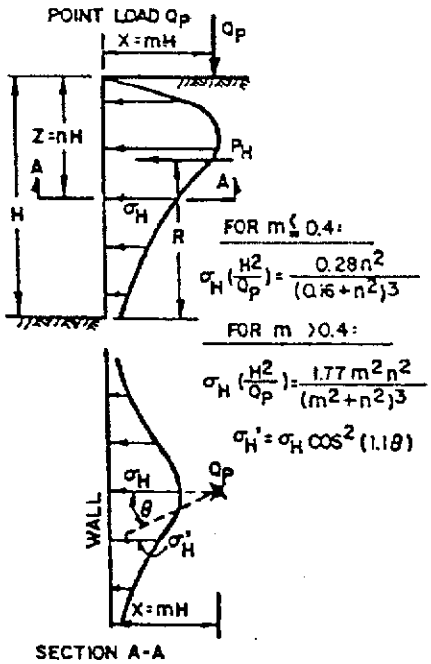
$$\sigma_H(\frac{H}{Q_L}) = \frac{1.28m^2n}{(m^2+n^2)^2}$$

RESULTANT $P_H = \frac{0.64 Q_L}{(m^2+1)}$

PRESSURES FROM LINE LOAD Q_L

(BOUSSINESQ EQUATION MODIFIED BY EXPERIMENT)

Reference: Design Manual
NAVFAC DM-7.2
Figure 11
Page 7.2-74



FOR $m \leq 0.4$:

$$\sigma_H(\frac{H^2}{Q_P}) = \frac{0.28n^2}{(0.16+n^2)^3}$$

FOR $m > 0.4$:

$$\sigma_H(\frac{H^2}{Q_P}) = \frac{1.77m^2n^2}{(m^2+n^2)^3}$$

$$\sigma_H' = \sigma_H \cos^2(1.1\theta)$$

SECTION A-A
PRESSURES FROM POINT LOAD Q_P
(BOUSSINESQ EQUATION MODIFIED BY EXPERIMENT)

Steven Raas & Associates

FIGURE NO: 7 Surcharge Pressure Diagram -1

WEP R-155

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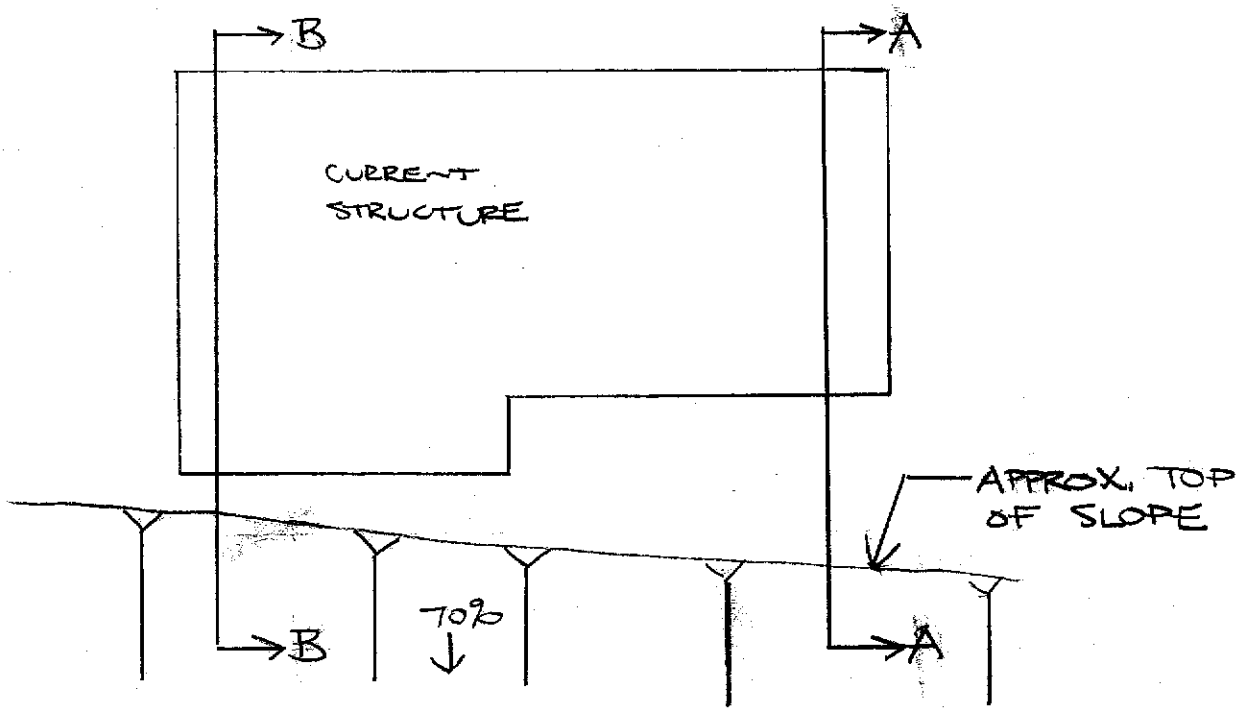
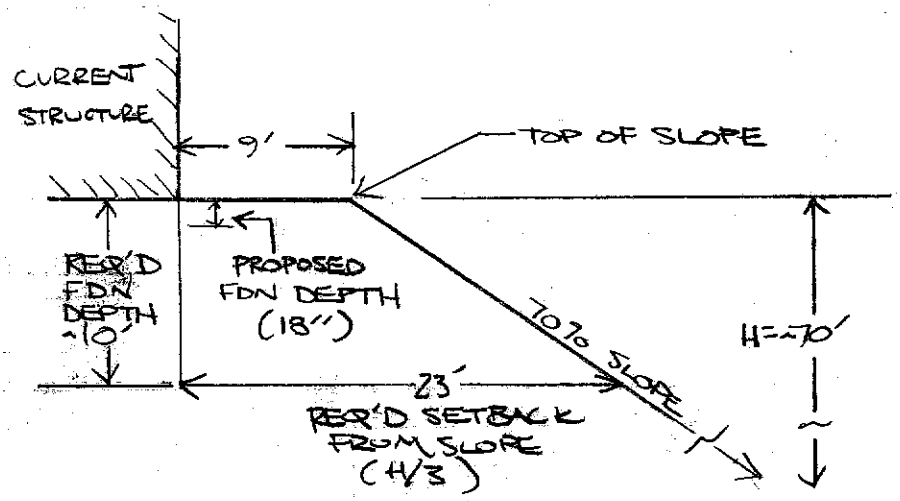
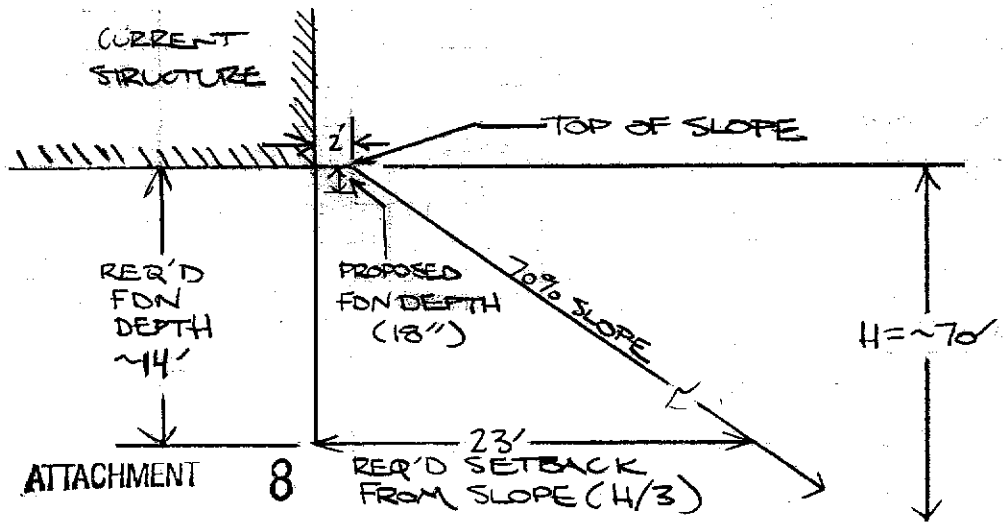
WATER REQUIRED
SLOPE SETBACKS PER 2001 CBC | SCALE: 1"=10' | DRAWN BY: KRM 4-12-2005 | 1/1





SECTION A-A



SECTION B-B

ATTACHMENT 8

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Chapter 16.10

GEOLOGIC HAZARDS

Sections:

16.10.010 Purpose.

The purposes of this chapter are:

(a) Policy Implementation. To implement the policies of the National Flood Insurance Program of the Federal Insurance Administration, the State of California Alquist-Priolo Earthquake Fault Zoning Act, the Santa Cruz County General Plan, and the Land Use Plan of the Local Coastal Program; and

(b) Public Health and Safety. To minimize injury, loss of life, and damage to public and private property caused by the natural physical hazards of earthquakes, floods, landslides, and coastal processes; and

(c) Development Standards. To set forth standards for development and building activities that will reduce public costs by preventing inappropriate land uses and development in areas where natural dynamic processes present a potential threat to the public health, safety, welfare, and property; and

(d) Notice of Hazards. To assure that potential buyers are notified of property located in an area of special flood hazard, and to assure that those who occupy areas of special flood hazard assume responsibility for their actions. (Ord. 3340, 11/23/82; 3598, 11/6/84; 4518-C, 3/8/99)

16.10.020 Scope.

This chapter sets forth regulations and review procedures for development and construction activities including grading, septic systems installation, development permits, changes of use as specified in Section 16.10.040(s)8, building permits, minor land divisions, and subdivisions throughout the County and particularly within mapped geologic hazards areas and areas of special flood hazard (SFHAs). These regulations and procedures shall be administered through a system of geologic hazard assessment, technical review, development and building permits. (Ord. 3340, 11/23/82; 3598, 11/6/84; 3635, 3/26/85; 4518-C, 3/8/99)

16.10.022 Statutory authorization.

The State of California has in Government Code Sections 65302, 65560, 65800 conferred upon local government units the authority to adopt regulations designed to promote public health, safety, and general welfare of its citizenry through the adoption of the following geologic hazard and floodplain management regulations. (Ord. 4518-C, 3/8/99)

16.10.025 Basis for establishing the areas of special flood hazard.

The areas of special flood hazard identified by the Federal Insurance Administration (FIA) of the Federal Emergency Management Agency (FEMA) in the Flood Insurance Study (FIS) dated April 15, 1986, and accompanying Flood Insurance Rate Maps (FIRMs) and Flood Boundary and Floodway Maps (FBFMs), dated April 15, 1986, and all subsequent amendments and/or revisions, are hereby adopted by reference and declared to be a part of this Chapter. This FIS and attendant mapping is the minimum area of applicability of the flood regulations contained in this Chapter, and may be supplemented by studies for other areas. The FIS, FIRMs,

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and FBFMs are on file at the County Government Center, Planning Department. (Ord. 4518-C, 3/8/99)

16.10.030 Amendment procedure.

Any revision to this chapter which applies to the Coastal Zone shall be reviewed by the Executive Director of the California Coastal Commission to determine whether it constitutes an amendment to the Local Coastal Program. When an ordinance revision constitutes an amendment to the Local Coastal Program, such revision shall be processed pursuant to the hearing and notification provisions of Chapter 13.03 of the County Code and shall be subject to approval by the California Coastal Commission. (Ord. 3340, 11/23/82; 3598, 11/6/84)

16.10.035 Conflict with existing regulations.

This Chapter is not intended to repeal, nullify, or impair any existing easements, covenants, or deed restrictions. If this Chapter and any other ordinance, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail. (Ord. 4518-C, 3/8/99)

16.10.036 Warning and disclaimer of liability.

The degree of flood protection required by the ordinance is considered reasonable for regulatory purposes based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by artificial or natural causes. This ordinance does not imply that land outside the Special Flood Hazard Areas or uses permitted within such areas will be free from flooding or flood damages. This ordinance shall not create liability on the part of Santa Cruz County, any officer or employee thereof, the State of California, or the Federal Insurance Administration, Federal Emergency Management Agency, for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made hereunder. (Ord. 4518-C, 3/8/99)

16.10.037 Severability.

This ordinance and the various parts thereof are hereby declared to be severable. Should any section of this ordinance be declared by the courts to be unconstitutional or invalid, such decision shall not affect the validity of the ordinance as a whole, or any portion thereof other than the section so declared to be unconstitutional or invalid. (Ord. 4518-C, 3/8/99)

16.10.040 Definitions.

For the purposes of this chapter, the following definitions apply:

(a) Accessory Use. Any use which is clearly incidental and secondary to the main use and does not change the character of the main use.

(b) Active. A geologic feature (fault or landslide) which shows evidence of movement, surface displacement, or activity within Holocene time (about the last 11,000 years).

(c) Addition. Improvement to an existing structure that increases the area, measured in square feet. The use of breeze ways, corridors, or other non-integral connections between structures shall not cause separate buildings or structures to be considered additions to an existing structure.

(d) Adjacent/contiguous parcel. A parcel touching the subject parcel and not separated from the subject parcel by a road, street or other property.

(e) Areas of special flood hazard. An area having special flood hazard as identified by the Federal Insurance Administration, through the Federal Emergency Management Agency, and shown on an FHBM or FIRM map as Zone A, AO, A1-A30, AE, A99, V1-V30, VE or V. Also known as Special Flood Hazard Area (SFHA).

(f) Base Flood. A flood which has a one percent chance of being equaled or exceeded in any given year. For flood insurance purposes one-hundred year flood and base flood have the same meaning.

(g) Basement. For the purposes of this Chapter, any area of the building having its floor subgrade (below ground level) on all sides.

(h) Beach erosion. Temporary or permanent reduction, transport or removal of beach sand by littoral drift, tidal actions, storms or tsunamis.

(i) Certified Engineering Geologist. A Registered Geologist who is licensed by the State of California to practice the sub-specialty of Engineering Geology.

(j) Coastal Bluff. A bank or cliff along the coast subject to coastal erosion processes. Coastal bluff refers to the top edge, face, and base of the subject bluff.

(k) Coastal dependent uses. Any development or use which would not function or operate unless sited on or adjacent to the ocean.

(l) Coastal erosion processes. Natural forces that cause the breakdown and transportation of earth or rock materials on or along beaches and bluffs. These forces include landsliding, surface runoff, wave action and tsunamis.

(m) Coastal hazard areas. Areas which are subject to physical hazards as a result of coastal processes such as

landsliding, erosion of a coastal bluff, and inundation or erosion of a beach by wave action.

(n) Coastal High Hazard Area. Areas subject to high velocity waters, including tidal and coastal inundation. These areas and base flood elevations are identified on a Flood Insurance Rate Map (FIRM) as Zones V1-30, VE or V.

(o) County geologist. A County employee who is registered as a geologist with the State of California (R.G.) and has been authorized by the Planning Director to assist in the administration of this chapter, or a registered geologist under contract by the County who has been authorized by the Planning Director to assist in the administration of this chapter. (Ord. 4090, 12/4/90; 4518-C, 3/8/99)

(p) County geologic advisor. An individual who is registered as a geologist with the State of California (R.G.), who may be employed by the County to provide geologic services.

(q) Critical structures and facilities. Structures and facilities which are subject to specified seismic safety standards because of their immediate and vital public need or because of the severe hazard presented by their structural failure. These structures include hospitals and medical facilities, fire and police stations, disaster relief and emergency operating centers, large dams and public utilities, public transportation and communications facilities, buildings with involuntary occupancy such as schools, jails, and convalescent homes, and high occupancy structures such as theaters, churches, office buildings, factories, and stores.

(r) Cumulative improvement. For the purposes of calculating "substantial improvement" as defined in Section 16.10.040(3m), two or more instances of repair, reconstruction, alteration, addition, or improvement to a structure, over the course of five consecutive years. If the value of such activities, when added together, equals or exceeds fifty (50) percent of the market value of the structure, the activity as a whole shall be considered to be a "substantial improvement."

(s) Development/Development Activities. For the purposes of this chapter, and this chapter only, any project that includes activity in any of the following categories is considered to be development or development activity. This chapter does not supercede Section 13.20.040 for purposes of determining whether a certain activity or project requires a coastal permit; some activities and projects will require coastal permits although they do not fall under this following specific definition.

(1) The construction or placement of any habitable structure, including a manufactured home;

(2) Any repair, reconstruction, alteration, addition, or improvement of a habitable structure that modifies or replaces more than fifty (50) percent of the total length of the exterior walls, exclusive of interior and exterior wall coverings and the replacing of windows or doors without altering their openings. This allows a total modification or replacement of up to fifty (50) percent, measured as described above, whether the work is done at one time or as the sum of multiple projects during the life of the structure;

(3) The addition of habitable space to any structure, where the addition increases the habitable space by more than fifty (50) percent over the existing habitable space, measured in square feet. This allows a total increase of up to fifty (50) percent of the original habitable space of a structure, whether the additions are constructed at one time or as the sum of multiple additions during the life of the structure;

(4) An addition of any size to a structure that is located on a coastal bluff, dune, or in the coastal hazard area, that extends the existing structure in a seaward direction;

(5) Installation of a new foundation for a habitable structure;

(6) The repair, replacement, or upgrade of an existing foundation of a habitable structure that affects more than fifty (50) percent of the foundation (measured in linear feet for perimeter foundations, square feet for slab foundations, or fifty (50) percent of the total number of piers), or an addition to an existing foundation that adds more than fifty (50) percent of the original foundation area. This allows repair, upgrade, or addition up to fifty (50) percent, measured as described above, whether the work is performed at one time or as the sum of multiple projects during the life of the structure;

(7) A division of land or the creation of one or more new building sites, except where a land division is accomplished by the acquisition of such land by a public agency for public use;

(8) Any change of use from non-habitable to habitable use, according to the definition of "habitable" found in Section 16.10.040, or a change of use from any non-critical structure to a critical structure.

(9) Any alteration of any structure posted "Unsafe to Occupy" due to geologic hazards;

(10) Grading activities of any scale in the 100 year floodplain or the coastal hazard area, and any grading activity which requires a permit pursuant to Chapter 16.20;

(11) Construction of roads, utilities, or other facilities.

(12) Retaining walls which require a building permit, retaining walls that function as a part of a landslide repair

whether or not a building permit is required, sea walls, rip-rap erosion protection or retaining structures, and gabion baskets;

(13) Installation of a septic system;

(14) Any human made change to developed or undeveloped real estate in the Special Flood Hazard Area, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation, drilling operations, or storage of equipment or materials. This is in addition to any activity listed in items 1—13.

(15) Any other project that is defined as development under Section 13.20.040, and that will increase the number of people exposed to geologic hazards or that may create or exacerbate an existing geologic hazard, shall be determined by the Planning Director to constitute development for the purposes of geologic review. (Ord. 4024, 10/24/89; 4080, 9/11/90)

(t) Development envelope. A designation on a site plan or parcel map indicating where buildings, access roads and septic systems are to be located.

(u) Fault zones. A zone or zones of fracture designated in the General Plan or Local Coastal Program Land Use Constraints Maps, or other maps and source materials authorized by the Planning Director.

(v) Fill. The deposit of earth or any other substance or material by artificial means for any purpose, or the condition resulting from a fill taking place.

(w) Flood Boundary Floodway Map. The map adopted by the Board of Supervisors and used for land use planning and permit review on which the Federal Insurance Administration has delineated the areas of special flood hazard.

(x) Flood control structure. Any structure or material, including but not limited to a berm, levee, dam or retaining wall, placed in areas where flooding occurs, and constructed for the purpose of protecting a structure, roads, utility or transmission line.

(y) Flood Insurance Rate Map (FIRM). The map adopted by the Board of Supervisors and used for insurance purposes on which the Federal Insurance Administration has delineated the special flood hazard areas, base flood elevations and the risk premium zones applicable to the community. The FIRM became effective on April 15, 1986 for insurance purposes.

(z) Flood Insurance Study. The official report on file with the Planning Department provided by the Federal Emergency Management Agency entitled, "The Flood Insurance Study Santa Cruz County, California" dated April 15, 1986 that includes flood profiles, the FIRM, the Flood Boundary Floodway Map, and the water surface elevation of the base flood.

(2a) Floodplain. Any land area susceptible to being inundated by water from any source. The one-hundred year floodplain is used for planning purposes by Federal agencies and the County. For many larger and more densely populated drainages, the 100 year floodplain is designated on Flood boundary and Floodway Maps prepared by the Federal Insurance Administration. See also "Area of Special Flood Hazard."

(2b) Floodplain Administrator. The Planning Director, or single staff member that is designated by the Director, to manage the administration and implementation of the National Flood Insurance Program regulations and the flood control provisions of this ordinance.

(2c) Floodproofing. Any combination of structural and non-structural additions, changes or adjustments to non-residential structures which reduce or eliminate flood damage to real estate or improved property.

(2d) Floodway. The channel of a river or other watercourse and the adjacent land area that must be reserved in order to carry and discharge the one-hundred year flood without cumulatively increasing the water surface elevation more than one foot at any point. Also referred to as the Regulatory Floodway.

(2e) Geologic hazard. A threat to life, property, or public safety caused by geologic or hydrologic processes such as flooding, wave inundation, landsliding, erosion, faulting, ground cracking, and secondary seismic effects including liquefaction, landsliding, tsunami and ground shaking.

(2f) Geologic hazards assessment. A summary of the possible geologic hazards present at a site conducted by the staff geologist.

(2g) Geologic report, full. A complete geologic investigation conducted by a Certified Engineering Geologist hired by the applicant, and completed in accordance with the County Geologic Report Guidelines.

(2h) Grading. Excavating or filling land, or a combination thereof.

(2i) Habitable. For the purposes of this Chapter, any structure or portion of a structure, whether or not enclosed, that is usable for living purposes, which include working, sleeping, eating, recreation, or any combination thereof. The purpose and use of the space, as described above, defines the habitable nature of the space. The term "habitable" also includes any space that is heated or cooled, humidified or dehumidified for the provision of human comfort, and/or is insulated and/or finished in plasterboard, and/or contains plumbing other than hose bibs.

(2j) Hardship. For the purposes of administering Section 16.10.100, means the exceptional hardship that

would result from failure to grant the requested Exception. The specific hardship must be exceptional, unusual, and peculiar to the property involved. Economic or financial hardship alone is not exceptional. Inconvenience, aesthetic considerations, personal preferences, or the disapproval of neighbors also cannot qualify as exceptional hardship, as these problems can be resolved through means other than granting an Exception, even if those alternative means are more expensive, require a property owner to build elsewhere, or put the parcel to a different use than originally intended or proposed.

(2k) High and very high liquefaction potential areas. Areas that are prone to liquefaction caused by groundshaking during a major earthquake. These areas are designated on maps which are on file with the Planning Department.

(2l) Historic Structure. Any structure that is: 1. Listed individually in the National Register of Historic Places, or preliminarily determined by the Secretary of the Interior to meet the requirements for such listing; 2. Certified as or preliminarily determined by the Department of the Interior to be contributing to the historical significance of a registered historical district or a district preliminarily determined to qualify as a historic district by the Secretary of the Interior; 3. Individually listed on the State Register of Historic Places which has been approved by the Secretary of the Interior; or, 4. Individually listed in the inventory of historic structures in a community with a historic preservation program that has been certified either by an approved state program or directly by the Secretary of the Interior.

(2m) Hydrologic investigation. A report prepared by a Certified Engineering geologist or civil engineer with expertise in hydrology which analyzes surface hydrology and/or groundwater conditions.

(2n) Littoral drift. The movement of beach sand parallel to the coast due to wave action and currents.

(2o) Liquefaction. The process whereby saturated, loose, granular materials are transformed by ground shaking during a major earthquake from a stable state into a fluid-like state.

(2p) Lowest Floor. For flood purposes, the lowest floor of the lowest enclosed area of a structure, including any basement.

(1) An unfinished or flood resistant enclosure, below the lowest floor, that is usable solely for parking of vehicles, building access or storage in an area other than a basement area, for the purposes of this Chapter, is not considered a building's lowest floor, provided it conforms to applicable non-elevation design requirements, including, but not limited to:

(i) the wet floodproofing standards in Section 16.10.070(f)(3)(ix)

(ii) the anchoring and construction materials and methods in Section 16.10.070(f)(3)(ii)

(iii) the standards for septic systems and water supply in Section 16.10.070(f)(5) and (f)(6).

(2) For residential structures, all fully enclosed subgrade areas are prohibited as they are considered to be basements. This prohibits garages and storage areas that are below grade on all sides.

(2q) Manufactured home. A structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when connected to the required utilities. For floodplain management purposes the term "manufactured home" also includes park trailers, travel trailers and other similar vehicles placed on a site for greater than 180 consecutive days.

(2r) Manufactured home park or subdivision. A parcel (or contiguous parcels) of land divided into two or more manufactured home lots for sale or rent.

(2s) Mean Sea Level. The National Geodetic Vertical Datum (NGVD) of 1929, or other measurement, to which base flood elevations shown on a community's Flood Insurance Rate Map are referenced.

(2t) Multiple-residential structure. A single structure containing four or more individual residential units.

(2u) Natural disaster. Any situation in which the force or forces of nature causing destruction are beyond the control of people.

(2v) New Construction. For the purposes of Sections 16.10.070(f), (g), and (h), structures for which the start of construction commenced on or after April 15, 1986, including any subsequent improvements to such structures.

(2w) Non-essential public structures. Public structures which are not integral in providing such vital public services as fire and police protection, sewer, water, power and telephone services.

(2x) Obstruction. Includes, but is not limited to, any dam, wall, wharf, embankment, levee, dike, pile, abutment, protection, excavation, channelization, bridge, conduit, culvert, building, wire, fence, rock, gravel, refuse, fill, structure, vegetation or other material in, along, across, or projecting into any watercourse which may alter, impede, retard or change the direction and/or velocity of the flow of water, snare or collect debris carried by the flow of water, or is likely to be carried downstream.

(2y) One-hundred year flood. A flood that statistically could occur once in 100 years on the average, although it could occur in any year. For flood insurance purposes,

one-hundred year flood and base flood have the same meaning. See Base Flood.

(2z) Planning Director. The Planning Director of the County of Santa Cruz or his or her authorized employee.

(3a) Public facilities. Any structure owned and/or operated by the government directly or by a private corporation under a government franchise for the use or benefit of the community.

(3b) Recent. A geologic feature (fault or landslide) which shows evidence of movement or activity within Holocene time (about the last 11,000 years.)

(3c) Registered Geologist. A geologist who is licensed by the State of California to practice geology.

(3d) Registered Geotechnical (Soils) Engineer. A civil engineer licensed in the State of California, experienced in the practice of soils and foundation engineering.

(3e) Regulatory Floodway. See Floodway.

(3f) Recreational Vehicle. Means a vehicle which is built on a single chassis; is 400 square feet or less when measured at the largest horizontal projection; designed to be self propelled or permanently towable by a light-duty truck; and designed primarily not for uses as a permanent dwelling but a temporary living quarters for recreation, camping, travel, or seasonal use.

(3g) Shoreline protection structure. Any structure or material, including but not limited to riprap or a seawall, placed in an area where coastal processes operate.

(3h) Soil Investigation. A report prepared by a registered soils engineer, hired by the applicant, and completed in accordance with the County Soils Report Guidelines. This term is synonymous with the term geotechnical investigation.

(3i) Special Flood Hazard Area (SFHA). See Area of Special Flood Hazard.

(3j) Start of Construction. The date the first building permit was issued, provided actual construction, repair, reconstruction, alteration, addition, rehabilitation, placement, or other improvement was begun within the terms of the permit. "Actual construction" means either the first placement of a structure on the site, such as pouring a slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading, and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds which are not occupied as dwelling units or are not part of the main structure. For the purposes of the phrase "substantial improvement," actual construction means the first alteration of any wall, ceiling, floor, or other structural part of the building, whether or not that alteration affects the external dimensions of the building.

(3k) Structure. Anything constructed or erected which requires a location on the ground, including, but not limited to, a building, manufactured home, gas or liquid storage tank, or facility such as a road, retaining wall, pipe, flume, conduit, siphon, aqueduct, telephone line, electrical power transmission or distribution line.

(3l) Substantial Damage. Damage of any origin, sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure as it existed before the damage occurred.

(3m) Substantial Improvement. Any repair, reconstruction, rehabilitation, addition, alteration or improvement to a structure, or the cumulative total of such activities as defined in Section 16.10.040(r), the cost of which equals or exceeds 50 percent of the market value of the structure either immediately prior to the issuance of the building permit. This term includes structures that have incurred "substantial damage" regardless of the actual repair work proposed or performed. This term does not include any project or portion of a project to upgrade an existing habitable structure to comply with current state or local health, sanitary, or safety code specifications which are the minimum necessary to assure safe living conditions, any alteration of an historic structure, provided that the alteration will not preclude the structure's continued designation as an historic structure. (See also Cumulative Improvement) (Ord. 4080, 9/11/90; 4518-C, 3/8/99)

(3n) Sub-surface geologic investigation. A geologic report prepared by a Certified Engineering geologist that provides information on subsurface materials through trenching, test pits and borings.

(3o) V-Zone. See "Coastal High Hazard Area."

(3p) Violation. The failure of a structure or other development to be fully compliant with this Chapter. A structure or other development without the elevation certificate, other certifications or required permits, or other evidence of compliance required in this Chapter is presumed to be in violation until such time as the required documentation has been provided.

(3q) Watercourse. A lake, river, creek, stream, wash, arroyo, channel or other topographic feature on or over which waters flow at least periodically. Watercourse includes specifically designated areas in which substantial

flood damage may occur. (Ord. 3340, 11/23/82; 3598, 11/6/84; 3892, 3/15/88; 3997, 6/6/89; 4518-C, 3/8/99)

16.10.050 Requirements for geologic assessment.

(a) All development is required to comply with the provisions of this Chapter, specifically including but not limited to, the placement of manufactured homes in the areas designated as SFHAs in the Flood Insurance Study.

(b) Hazard Assessment Required. A geologic hazards assessment shall be required for all development activities in the following designated areas: fault zones, one-hundred year floodplains and floodways, and coastal hazard areas, except: as specified in subsections (c) (d) and (e), where a full geologic report will be prepared according to the County Guidelines for Engineering Geologic Reports, or where the County Geologist finds that there is adequate information on file. A geologic hazards assessment shall also be required for development located in other areas of geologic hazard, as identified by the County Geologist or designee, using available technical resources, from environmental review, or from other field review.

(c) Geologic Report Required. A full geologic report shall be required:

1. For all proposed land divisions and critical structures and facilities in the areas defined as Earthquake Fault Zones on the state Alquist-Priolo Earthquake Fault Zoning Act maps,

2. Whenever a significant potential hazard is identified by a geologic hazards assessment,

3. For all new reservoirs to serve major water supplies,

4. Prior to the construction of any critical structure or facility in designated fault zones, and

5. When a property has been identified as "Unsafe to Occupy" due to adverse geologic conditions, no discretionary approval or building permit (except approvals and permits that are necessary solely to mitigate the geologic hazard) shall be issued prior to the review and approval of geologic reports and the completion of mitigation measures, as necessary.

(d) Potential Liquefaction Area. A site specific investigation by a Certified Engineering Geologist and/or soil engineer shall be required for all development applications for more than four residential units and for structures greater than one story in areas of high or very high liquefaction potential. Development applications for four units or less, one story structures and non-residential projects shall be reviewed for liquefaction hazard through environmental review and/or geologic hazards assessment. When a significant hazard may exist, a site specific investigation shall be required.

(e) Additional Report Requirements. Additional information (including but not limited to full geologic, subsurface geologic, hydrologic, geotechnical or other engineering investigations and reports) shall be required when a hazard or foundation constraint requiring further investigation is identified. (Ord. 3340, 11/23/82; 3598, 11/6/84; 4518-C, 3/8/99)

16.10.060 Assessment and report preparation and review.

(a) Timing of Geologic Review. Any required geologic, soil, or other technical report shall be completed, reviewed and accepted pursuant to the provisions of this section before any public hearing is scheduled and before any discretionary or development application is approved or issued. The County Geologist may agree to defer the date for completion, review, or acceptance of any technical report where the technical information is 1) unlikely to significantly affect the size or location of the project, and 2) the project is not in the area of the Coastal Zone where decisions are appealable to the Coastal Commission. In no event shall such be deferred until after the approval or issuance of a building permit.

1. An application for a geologic hazards assessment shall include a plot plan showing the property boundaries and location of proposed development activities. Any other information deemed necessary by the County Geologist (including but not limited to topographic map, building elevations or grading plans) shall be submitted upon request.

2. An application for a geologic hazards assessment or a technical report review constitutes a grant of permission for the Planning Director, or agents, to enter the property for the purposes of responding to the application.

(b) Report Preparation. The geologic hazards assessment shall be prepared by County staff. Alternately, the assessment may be conducted by a private Certified Engineering Geologist at the applicant's choice and expense. Such privately prepared assessments shall, however, be subject to review and approval as specified in this section.

(c) Report Acceptance. All geologic, geotechnical, engineering, and hydrologic reports or investigations submitted to the County as a part of any development application shall be found to conform to County report guidelines. The Planning Director may require an inspection in the field of all exploratory trenches, test pits, and borings excavated for a technical report.

(d) Hazard Assessment and Report Expiration. A geologic hazards assessment and all recommendations and requirements given therein, shall remain valid for three years from the date of completion, unless a shorter period is specified in the report by the preparer. A full geologic report shall be valid and all recommendations therein shall remain in effect for three years from the date of completion of the report. The exception to the three year period of validity is where a change in site conditions, development proposal, technical information or County policy significantly affects the technical data, analysis, conclusions or requirements of the assessment or report; in which case the Planning Director may require a new or revised assessment or report. (Ord. 3340, 11/23/82; 3598, 11/6/84; 4518-C, 3/8/99)

16.10.070 Permit conditions.

The recommendations of the geologic hazards assessment, full geologic report, and/or the recommendations of other technical reports (if evaluated and authorized by the Planning Director), shall be included as permit conditions of any permit or approvals subsequently issued for the development. In addition, the requirements described below for specific geologic hazards shall become standard conditions for development, building and land division permits and approvals. No development, building and land division permits or approvals shall be issued, and no final maps or parcel maps shall be recorded, unless such activity is in compliance with the requirements of this section.

(a) General. If a project is not subject to geologic review because the structure is non-habitable and is not otherwise considered to be development under this Chapter, a Declaration of Restrictions for the non-habitable structure shall be recorded that includes an acknowledgment that any change of use to a habitable use, or physical conversion to habitable space, shall be subject to the provisions of this Chapter.

(b) Fault Zones.

1. Location: Development shall be located away from potentially hazardous areas as identified by the geologic hazards assessment or full geologic report, and

2. Setbacks: Habitable structures shall be set back a minimum of fifty feet from the edge of the area of fault induced offset and distortion of active and potentially active fault traces. This setback may be reduced to a minimum of twenty five feet from the edge of this zone, based upon paleoseismic studies that include observation trenches. Reductions of the required setback may only occur when both the consulting engineering geologist preparing the study and the County Geologist observe the trench and concur that the reduction is appropriate. Critical structures and facilities shall be set back a minimum of one hundred feet from the edge of the area of fault induced offset and distortion of active and potentially active fault traces.

3. Notice of Hazards: The developer and/or subdivider of a parcel or parcels in an area of geologic hazards shall be required, as a condition of development approval and building permit approval, to record a Declaration of Geologic Hazards with the County Recorder. The Declaration shall include a description of the hazards on the parcel, and the level of geologic and/or geotechnical investigation conducted.

4. Other Conditions: Other permit conditions, including but not limited to project redesign, elimination of building sites, and the delineation of development envelopes, building setbacks and foundation requirements, shall be required as deemed necessary by the Planning Director.

(c) Groundshaking.

1. New Dams: Dams shall be constructed according to high seismic design standards of the Dam Safety Act and as specified by structural engineering studies.

2. Public Facilities and Critical Structures and facilities: All new public facilities and critical structures shall be designed to withstand the expected groundshaking during the design earthquake on the San Andreas fault or San Gregorio fault.

3. Other Conditions: Other permit conditions including but not limited to structural and foundation requirements shall be required as deemed necessary by the Planning Director.

(d) Liquefaction Potential.

1. Permit Conditions: Permit conditions including, but not limited to, project redesign, elimination of building sites, delineation of development envelopes and drainage and foundation requirements shall be required as deemed necessary by the Planning Director.

2. Notice of Hazards: The developer and/or subdivider of a parcel or parcels in an area of geologic hazards shall be required, as a condition of development approval and building permit approval, to record a Declaration of Geologic Hazards and the County Recorder. The Declaration shall include a description of the hazards on the parcel, and the level of geologic and/or geotechnical investigation conducted.

(e) Slope Stability.

1. Location: All development activities shall be located away from potentially unstable areas as identified through the geologic hazards assessment, full geologic

report, soils report or other environmental or technical assessment.

2. Creation of New Parcels: Allow the creation of new parcels in areas with potential slope instability as identified through a geologic hazards assessment, full geologic report, soils report or other environmental or technical assessment only under the following circumstances:

(i) New building sites, roadways, and driveways shall not be permitted on or across slopes exceeding thirty (30) percent grade.

(ii) A full geologic report and any other appropriate technical report shall demonstrate that each proposed parcel contains at least one building site and access which are not subject to significant slope instability hazards, and that public utilities and facilities such as sewer, gas, electrical and water systems can be located and constructed to minimize landslide damage and not cause a health hazard.

(iii) New building sites shall not be permitted which would require the construction of engineered protective structures such as retaining walls, diversion walls, debris walls or slough walls designed to mitigate potential slope instability problems such as debris flows, slumps or other types of landslides.

3. Drainage: Drainage plans designed to direct runoff away from unstable areas (as identified from the geologic hazards assessment or other technical report) shall be required. Such plans shall be reviewed and approved by the County Geologist.

4. Leach Fields: Septic leach fields shall not be permitted in areas subject to landsliding as identified through the geologic hazards assessment, environmental assessment, or full geologic report.

5. Road Reconstruction: Where washouts or landslides have occurred on public or private roads, road reconstruction shall meet the conditions of appropriate geologic, soils and/or engineering reports and shall have adequate engineering supervision.

6. Notice of Hazards: The developer and/or subdivider of a parcel or parcels in an area of geologic hazards shall be required to record a Declaration of Geologic Hazards with the County Recorder. The Declaration shall include a description of the hazards on the parcel, and the level of geologic and/or geotechnical investigation conducted.

7. Other Conditions: Other permit conditions including but not limited to project redesign, building site elimination and the development of building and septic system envelopes, building setbacks and foundation and drainage requirements shall be required as deemed necessary by the Planning Director.

(f) Floodplains.

1. Critical and Public Facilities: Critical facilities and nonessential public structures and additions shall be located outside of the one hundred year floodplain unless such facilities are necessary to serve existing uses, there is no other feasible location and construction of these structures will not increase hazards to life on property within or adjacent to the floodplain.

2. Creation of New Parcels: Allow the creation of new parcels including those created by minor land division or subdivision in the one hundred year floodplain only under the following circumstances:

(i) A full hydrologic report and any other appropriate technical report must demonstrate that each proposed parcel contains at least one building site, including a septic system and leach field site, which is not subject to flood hazard, and that public utilities and facilities such as sewer, gas, electrical and water systems can be located and constructed to minimize flood damage and not cause a health hazard.

(ii) A declaration indicating the limits and elevations of the one hundred year floodplain certified by a registered professional engineer or surveyor must be recorded with the County Recorder. (Ord. 3635, 3/26/85; 4518-C, 3/8/99)

(iii) Adequate drainage to reduce exposure to flood hazards must be provided.

(iv) Preliminary land division proposals shall identify all flood hazard areas and the elevation of the base flood.

3. Development Criteria and Design Requirements: All development within the 100-year floodplain shall meet the following criteria. Any addition, repair, reconstruction, rehabilitation, alteration, or improvement of structures for which building permits were issued prior to April 15, 1986, when subject to the definition of "cumulative improvement," does not meet the definition of "substantial improvement" (Pursuant to Section 16.10.040(r) and (3m)), is exempt from this section.

(i) location of proposed structures outside of the one-hundred year floodplain when a buildable portion of the property exists outside the floodplain;

(ii) anchoring of foundations and the structures attached to them by a method adequate to prevent flotation, collapse and lateral movement of the structures due to the forces that may occur during the base flood, including hydrostatic and hydrodynamic loads and the effects of buoyancy.

A project involving a manufactured home shall achieve this by one of the following methods:

(A) by providing an anchoring system designed to withstand horizontal forces of 15 pounds per square foot and up lift forces of 9 pounds per square foot; or,

(B) by the anchoring of the unit's system, designed to be in compliance with the Department of Housing and Development Mobile Home Construction and Safety Standards.

(iii) shall be constructed with materials and utility equipment resistant to flood damage and using construction methods and practices that minimize flood damage;

(iv) shall be constructed with electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities that are designed and/or located to prevent water from entering or accumulating within the components during conditions of flooding;

(v) In flood zones A-O and A-H, provide drainage paths adequate to guide water away from structures and reduce exposure to flood hazards. (Ord. 4071, 7/17/90, 4518-C, 3/8/99)

(vi) For residential structures, including manufactured homes, the lowest floor, including the basement, and the top of the highest horizontal structural member (joist or beam) which provides support directly to the lowest floor, and all elements that function as a part of the structure, such as furnace, hot water heater, etc., shall be elevated at least one foot above the one-hundred year flood level. Foundations shall be designed to minimize flood water displacement and flow damage. Where a piling or caisson foundation system is used the space below the lowest floor shall be free of obstruction or be enclosed with wood-constructed lattice work or screens designed to collapse or be carried away under the stress of flood waters without jeopardizing the structural support of the building. Compliance with the elevation requirement shall be certified by a registered professional engineer, architect, or surveyor and submitted to the Planning Director prior to a subfloor building inspection. Failure to submit elevation certification may be cause to issue a stop work notice for a project. The Planning Director will maintain records of compliance with elevation requirements.

(vii) Non-residential structures shall be floodproofed if elevation above the one-hundred year flood level in accordance with Section 16.10.070(f)3(vi) is not feasible. Floodproofed structures shall:

(A) be floodproofed so that below an elevation one foot higher than the one-hundred year flood level, the structure is watertight with walls substantially impermeable to the passage of water based on structural designs, specifications and plans developed or reviewed by a registered professional engineer or architect;

(B) be capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and,

(C) be certified by a registered professional engineer or architect that floodproofing standards and requirements have been complied with; the certification shall be submitted to the Planning Director and shall indicate the elevation to which floodproofing was achieved prior to a final building inspection. The Planning Director shall maintain records of compliance with floodproofing requirements.

(viii) In flood zone AO, residential structures shall have the lowest floor at or above the highest adjacent grade, at least as high as the depth number given on the FIRM, and non-residential structures, where elevation is not feasible, shall have the lowest floor completely floodproofed at or above the highest adjacent grade, at least as high as the depth number given on the FIRM.

(ix) Fully enclosed areas below the lowest floor that are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls allowing for the entry and exit of flood water. Designs for meeting this requirement must either be certified by a registered professional engineer or architect, or shall provide a minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding. The bottom of all openings shall be no higher than one foot above grade. Openings may be equipped with screens, louvers, valves or other coverings or devices provided that they permit the automatic entry and exit of flood waters. Non-residential structures that are floodproofed in compliance with Section 16.10.070(f)(3)(vii) are an exception to this requirement.

4. Recreational Vehicles: RVs that are placed on a site that is within the A, A1-A30, AH, AO or AE zones as designated in the FIS, and that are not fully licensed and highway ready, shall meet the criteria given in 16.10.070(f)(3)(ii) and (3)(vi), unless they are on the site for less than 180 consecutive days. For the purposes of this ordinance, "highway ready" means on wheels or jacking system, attached to the site by quick disconnect type utilities and security devices, and having no attached additions.

5. Septic Systems: New septic systems and leach fields shall not be located within the one-hundred year floodplain. The capacity of existing septic systems in the floodplain shall not be increased.

6. Water Supplies and Sanitary Sewage Systems: All new and replacement water supplies and sanitary sewage systems shall be designed to minimize or eliminate

infiltration of flood waters into the systems and discharge from the systems into flood waters.

7. Placement of Fill: Allow the placement of fill within the one-hundred year floodplain in the minimum amount necessary, not to exceed 50 cubic yards. Fill shall only be allowed if it can be demonstrated that the fill will not have cumulative adverse impacts.

8. Flood Control Structures: Flood control structures shall be permitted only to protect existing development (including agricultural operations) where no other alternative is feasible or where such protection is needed for public safety. Such structures shall not adversely affect sand supply, increase erosion or cause flooding on adjacent properties or restrict stream flows below minimums necessary to maintain fish and wildlife habitats or be placed further than necessary from the development requiring protection.

9. Notice of Hazards: The developer and/or subdivider of a parcel or parcels in an area of geologic or flood hazards shall be required, as a condition of development approval and building permit approval, to record a Declaration of Geologic Hazards with the County Recorder. The Declaration shall include a description of the hazards on the parcel or parcels and the level of prior hydrologic or geologic investigation conducted.

10. Other Conditions: Other permit conditions, including but not limited to, project redesign, building site elimination, development of building and septic envelopes, and foundation requirements shall be required as deemed necessary by the Planning Director. When base flood elevation data are not provided in the Flood Insurance Study, the Planning Director shall obtain, review, and reasonably utilize the best base flood data available from Federal, State or other sources, as a basis for elevating residential structures and floodproofing non-residential structures, to at least one foot above the base flood level. Residential structures shall be elevated no less than two (2) feet above natural grade when base flood data do not exist. Non-residential structures may elevate or flood proof to meet this standard.

11. Alteration or Relocation of Watercourse: Adjacent communities, the California Department of Water Resources and the Federal Emergency Management Agency shall be notified prior to any alteration or relocation of a major watercourse. The flood carrying capacity of any altered or relocated watercourses must be maintained.

12. Permit Requirements: All other required state and federal permits must be obtained.

(g) Permit Conditions—Floodways. Located within areas of Special Flood Hazard as established in 16.10.025, and within some areas not mapped as part of the Flood Insurance Study, are areas designated as floodways (see also 16.10.040 2d). The floodway is an extremely hazardous area due to the quantity and velocity of flood waters, the amount of debris which may be transported, and the high potential for erosion during periods of large stream flows. In the floodway the following provisions apply:

1. Development and Building Within Floodway Prohibited: All development activity, except for the reconstruction, repair, alteration or improvement of an existing structure, is prohibited within the floodway unless exempted by State or Federal laws. Any encroachment which would cause any increase in the base flood level is prohibited.

2. Sites Where Floodway Not Established. Where the Flood Insurance Study or other technical report has identified a flood hazard area but has not designated a floodway, the applicant must demonstrate, through hydrologic analysis, that the project will not adversely affect the carrying capacity of the area. For the purposes of this Chapter, "adversely affects" means that the cumulative effect of the proposed development, when combined with all other existing and anticipated development in the watershed, will increase the water surface elevation of the base flood more than one foot at any point. The hydrologic analysis must identify the boundaries of the floodway, and the project must comply with the provisions of Section (g)1, above.

3. Setback from Floodway: Where neither a Base Flood Elevation nor a floodway has been identified by the Flood Insurance Study or by a site specific hydrologic study, a minimum setback of 20 feet from the top edge of the banks of a drainage course shall be maintained, and all activity that takes up flood storage area within this setback shall be prohibited. This floodway setback may be reduced by the Planning Director only if a full hydrologic analysis identifies the boundaries of the floodway, demonstrates that a smaller setback will not increase the susceptibility of the proposed activity to flood related hazards, and there is no alternative location outside of the 20 foot setback. (See also Chapter 16.30, Riparian Protection, for vegetation related setbacks from streams.)

4. Location of Septic Systems. New septic systems and leach fields shall not be located in the floodway. The capacity of existing systems in the floodway shall not be increased.

5. Alteration of Structures in Floodway: Reconstruction, repair, alteration or improvement of a structure in a floodway shall not cause any increase in the base flood elevation. Substantial improvements, regardless

SECTION CXX

Section 15.10.030, Applicability, of the Santa Cruz County Code is hereby amended to be:

15.10.030 Applicability.

The requirements of this chapter shall apply as a condition of approval of any permit to build or place a structure or mobile home, or to divide land, on an arterial, or collector or local street, within a Transportation Improvement Area or within the Urban Services Line, where street width and roadside improvements meeting current County Design Criteria do not already exist. Parcels with roadside improvements constructed using moneys from trust funds, created according to Section 15.10.080, shall be required to pay for improvements along their property frontage either at the time such improvements are made or as a condition of a subsequent permit to build or place a structure or mobile home, change the use, or to divide land. This section shall ~~not~~ apply to permits for accessory structures. ~~or~~ This section shall not apply to ~~for~~ modifications or improvements of less than 70 square feet to existing structures or which do not result in the creation of additional bedrooms as defined by Section 13.10.700-B of the County Code. Notwithstanding any other provisions of this section, equivalent improvements may be required as a condition of a discretionary permit for any project which increases the intensity of use (automobile and/or pedestrian traffic) upon the recommendation of the Planning Director or Public Works Director.

SECTION CXXI

Section 16.10.070(h)4, Coastal bluffs and beaches, of the Santa Cruz County Code is hereby amended to be:

4. Alteration of Damaged Structures. Reconstruction, repair, rebuilding, replacement, alteration, improvement, or addition to damaged structures located on a coastal bluff shall proceed according to the following chart:

Extent of Damage	**50% or more of the value of structure**		**Less than 50% of the value of structure**	
Cause of Damage (horiz. axis)	Coastal Hazards & Slope Instability	All Other Causes (fire, etc.)	Coastal Hazards & Slope Instability	All Other Causes (fire, etc.)
Location of Existing Structure (vertical axis)				
Existing Structure Meets Setback (less than 10% extends	Meet all regulations	Exempt from regulations if repaired/replaced in kind. Otherwise meet all regulations.	Exempt from regulations if repaired/replaced in kind. Otherwise meet all regulations.	Exempt from regulations if repaired/replaced in kind. Otherwise meet all regulations.

into setback)				
Existing Structure Does Not Meet Setback but Could by relocating.	Meet all regulations, including setback for existing structure.	To repair or replace in kind, meet all regulations except setback. Otherwise meet all regulations, including prescribed minimum setback.	Exempt from regulations if repaired/replaced in kind. Otherwise meet all regulations, including prescribed minimum setback.	Exempt from regulations if repaired/replaced in kind. Otherwise meet all regulations, including prescribed minimum setback.
Existing Structure Does Not Meet Setback and Cannot meet setback by relocating	If hazard can be mitigated to provide stability for a period of 100 years, repair or replace in kind. Meet all regulations except setback. Cannot be rebuilt, even in kind, if hazard cannot be mitigated to a level that provides stability for a period of 100 years.	May repair or replace in kind. To repair or replace in kind, meet all regulations except setback. Hazards shall be mitigated to a level that provides stability for a period of 100 years, if feasible. ~~Otherwise~~ Projects in excess of "in-kind" shall meet all regulations, including prescribed minimum setback.	May repair or replace in kind. Hazards shall be mitigated to a level that provides stability for a period of 100 years, if feasible. Projects in excess of "in-kind" shall meet all regulations.	May repair or replace in kind. To repair or replace in kind, meet all regulations except setback. Hazards shall be mitigated to a level that provides stability for a period of 100 years, if feasible. Projects in excess of "in-kind" shall meet all regulations including prescribed minimum setback.

Public beach facilities are exempt from the provisions of this chart.

SECTION CXXII

Section 17.02.030 (a), Definitions, Coastal priority use, of the Santa Cruz County Code is hereby amended to be:

of cause, shall only be permitted in accordance with Section 16.10.070(f), above. Repair, reconstruction, alteration, or replacement of a damaged structure which does not exceed the ground floor square area of the structure before the damage occurred shall not be considered an increase in the base flood elevation.

6. Permit Requirements: All other required local, state and federal permits must be obtained.

(h) Coastal Bluffs and Beaches:

1. Criteria in Areas Subject to Coastal Bluff Erosion: Projects in areas subject to coastal bluff erosion shall meet the following criteria:

(i) for all development and for non-habitable structures, demonstration of the stability of the site, in its current, pre-development application condition, for a minimum of 100 years as determined by either a geologic hazards assessment or a full geologic report.

(ii) for all development, including that which is cantilevered, and for non-habitable structures, a minimum setback shall be established at least 25 feet from the top edge of the coastal bluff, or alternatively, the distance necessary to provide a stable building site over a 100-year lifetime of the structure, whichever is greater.

(iii) the determination of the minimum setback shall be based on the existing site conditions and shall not take into consideration the effect of any proposed protection measures, such as shoreline protection structures, retaining walls, or deep piers.

(iv) foundation replacement and/or foundation upgrades that meet the definition of development per Section 16.10.040(s) and pursuant to Section 16.10.040(r), shall meet the setback described in Section 16.10.070(h)(1), except that an exception to the setback requirement may be granted for existing structures that are wholly or partially within the setback, if the Planning Director determines that:

a) the area of the structure that is within the setback does not exceed 25% of the total area of the structure, OR

b) the structure cannot be relocated to meet the setback because of inadequate parcel size.

(v) additions, including second story and cantilevered additions, shall comply with the minimum 25 foot and 100 year setback.

(vi) The developer and/or the subdivider of a parcel or parcels in an area subject to geologic hazards shall be required, as a condition of development approval and building permit approval, to record a Declaration of Geologic Hazards with the County Recorder. The Declaration shall include a description of the hazards on the parcel and the level of geologic and/or geotechnical investigation conducted.

(vii) approval of drainage and landscape plans for the site by the County Geologist.

(viii) service transmission lines and utility facilities are prohibited unless they are necessary to serve existing residences.

(ix) All other required local, state and federal permits shall be obtained.

2. Exemption:

(i) Any project which does not specifically require a building permit pursuant to Section 12.10.070(b) is exempt from Section 16.10.070(h)1, with the exception of: non-habitable accessory structures that are located within the minimum 25 foot setback from the coastal bluff where there is space on the parcel to accommodate the structure outside of the setback, above-ground pools, water tanks, projects (including landscaping) which would unfavorably alter drainage patterns, and projects involving grading.

For the purposes of this Section, the unfavorable alteration of drainage is defined as a change that would significantly increase or concentrate runoff over the bluff edge or significantly increase infiltration into the bluff. Grading is defined as any earthwork other than minor leveling, of the scale typically accomplished by hand, necessary to create beneficial drainage patterns or to install an allowed structure, that does not excavate into the face or base of the bluff.

Examples of projects which may qualify for this exemption include: decks which do not require a building permit and do not unfavorably alter drainage, play structures, showers (where run-off is controlled), benches, statues, landscape boulders, benches, and gazebos which do not require a building permit.

(ii) If a structure that is constructed pursuant to this exemption subsequently becomes unstable due to erosion or slope instability, the threat to the exempted structure shall not qualify the parcel for a coastal bluff retaining structure or shoreline protection structure. If the exempted structure itself becomes a hazard it shall either be removed or relocated, rather than protected in place.

3. Shoreline protection structures shall be governed by the following:

(i) shoreline protection structures shall only be allowed on parcels where both adjacent parcels are already similarly protected, or where necessary to protect existing structures from a significant threat, or on vacant parcels which, through lack of protection threaten adjacent developed lots, or to protect public works, public beaches, and coastal dependent uses.

Note: New shoreline protection structures shall not be allowed where the existing structure proposed for

protection was granted an exemption pursuant to Section 16.10.070(h)2.

(ii) seawalls, specifically, shall only be considered where there is a significant threat to an existing structure and both adjacent parcels are already similarly protected.

(iii) application for shoreline protective structures shall include thorough analysis of all reasonable alternatives to such structures, including but not limited to relocation or partial removal of the threatened structure, protection of only the upper bluff area or the area immediately adjacent to the threatened structure, beach nourishment, and vertical walls. Structural protection measures on the bluff and beach shall only be permitted where non-structural measures, such as relocating the structure or changing the design, are infeasible from an engineering standpoint or are not economically viable.

(iv) shoreline protection structures shall be placed as close as possible to the development or structure requiring protection.

(v) shoreline protection structures shall not reduce or restrict public beach access, adversely affect shoreline processes and sand supply, adversely impact recreational resources, increase erosion on adjacent property, create a significant visual intrusion, or cause harmful impacts to wildlife or fish habitat, archaeologic or paleontologic resources. Shoreline protection structures shall minimize visual impact by employing materials that blend with the color of natural materials in the area.

(vi) all protection structures shall meet approved engineering standards as determined through environmental review.

(vii) all shoreline protection structures shall include a permanent, County approved, monitoring and maintenance program.

(viii) Applications for shoreline protection structures shall include a construction and staging plan that minimizes disturbance to the beach, specifies the access and staging areas, and includes a construction schedule that limits presence on the beach, as much as possible, to periods of low visitor demand. The plan for repair projects shall include recovery of rock and other material that has been dislodged onto the beach.

(ix) All other required local, state and federal permits shall be obtained.

4. Alteration of Damaged Structures. Reconstruction, repair, rebuilding, replacement, alteration, improvement, or addition to damaged structures located on a coastal bluff shall proceed according to the following chart:

Extent of Damage	50% or more of the value of structure		Less than 50% of the value of structure	
Cause of Damage (horiz. axis)	Coastal Hazards & Slope Instability	All Other Causes (fire, etc.)	Coastal Hazards & Slope Instability	All Other Causes (fire, etc.)
Location of Existing Structure (vertical axis)				
Existing Structure Meets Setback (less than 10% extends into setback)	Meet all regulations	Exempt from regulations if repaired/replaced in kind. Otherwise meet all regulations.	Exempt from regulations if repaired/replaced in kind. Otherwise meet all regulations.	Exempt from regulations if repaired/replaced in kind. Otherwise meet all regulations.
Existing Structure Does Not Meet Setback but Could by relocating.	Meet all regulations, including setback for existing structure.	To repair or replace in kind, meet all regulations except setback. Otherwise meet all regulations, including prescribed minimum setback.	Exempt from regulations if repaired/replaced in kind. Otherwise meet all regulations, including prescribed minimum setback.	Exempt from regulations if repaired/replaced in kind. Otherwise meet all regulations, including prescribed minimum setback.
Existing Structure Does Not Meet Setback and Cannot meet setback by relocating	If hazard can be mitigated to provide stability for a period of 100 years, repair or replace in kind. Meet all regulations except setback. Cannot be rebuilt, even in kind, if hazard cannot be mitigated to a level that provides stability for a period of 100 years.	To repair or replace in kind, meet all regulations except setback. Otherwise meet all regulations, including prescribed minimum setback.	May repair or replace in kind. Hazards shall be mitigated to a level that provides stability for a period of 100 years, if feasible. Projects in excess of "in-kind" shall meet all regulations.	May repair or replace in kind. Hazards shall be mitigated to a level that provides stability for a period of 100 years, if feasible. Projects in excess of "in-kind" shall meet all regulations.

Public beach facilities are exempt from the provisions of this chart.

5. Coastal High Hazard Area Development Criteria: All development, specifically including the placement of and construction on manufactured homes, shall meet the following criteria. For structures that had a building permit issued prior to April 15, 1986, any addition, repair, reconstruction, rehabilitation, alteration, or improvement, which, when subject to the definition of "cumulative improvement," does not meet the definition of "substantial improvement" (pursuant to Sections 16.10.040(r) and (3m)), is exempt from this section.

(i) demonstration that the potential hazards on the site can be mitigated, over the 100-year lifetime of the structure, as determined by the geologic hazards assessment or full geologic report and any other appropriate technical reports. Mitigations can include but are not limited to building setbacks, elevation of the proposed structure and foundation design;

(ii) location of the proposed structure landward of the reach of mean high tide and outside of the area of storm wave inundation where a buildable portion of the property is outside of the area of storm wave inundation;

(iii) elevation of all structures (including manufactured homes) on pilings and columns so that the bottom of the lowest portion of the lowest structural member of the lower floor (excluding the pilings or columns) and elements that function as part of the structure, such as furnace, hot water heater, etc., are elevated to or above the base flood level.

(iv) anchoring of the pile or column foundation and structure attached thereto to prevent flotation, collapse and lateral movement due to the effect of wind and water loads acting simultaneously on all building components. Wind and water loading values shall each have a one percent chance of being equaled or exceeded in any given year (100-year mean recurrence interval);

(v) a registered professional engineer or architect shall develop or review the structural design, specifications and plans for the construction, and shall certify that the design and methods of construction to be used are in accordance with accepted standards of practice for meeting the provisions of paragraphs (iii) and (iv) of this section prior to permit issuance;

(vi) the space below the lowest floor shall either be free of obstruction or constructed with non-supporting breakaway walls, open wood lattice-work or insect screening intended to collapse under wind and water loads without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system. For the purposes of this section, a breakaway wall shall be of non-masonry construction and have a design safe loading resistance of not less than ten (10) and no more than twenty (20) pounds per square foot. Use of breakaway walls which do not meet the above material and strength criteria may be permitted only if a registered professional engineer or architect certifies that the designs proposed will permit the breakaway wall to collapse under a water load less than that which would occur during the base flood and that the elevated portion of the building or supporting foundation system shall not be subject to collapse, displacement or other structural damage due to the effects of wind and water loads acting simultaneously on all building components. Such enclosed space shall be useable solely for vehicle parking, building access or storage, and shall not be a finished area or habitable area.

(vii) the use of fill for structural support of buildings is prohibited. (Ord. 4071, 7/17/90; 4518-C, 3/8/99)

(viii) the alteration of sand dunes which would increase potential flood damage is prohibited.

(ix) compliance with the provisions of paragraphs (iii) and (iv) above shall be certified by a registered professional engineer or architect and submitted to the Planning Director when the foundation work has been completed. Failure to submit elevation and structural certification may be cause to issue a stop-work notice for a project. The Planning Director shall maintain records of compliance with the elevation requirements.

(x) Recreational vehicles that are placed on a site that is within the V, V1-V30, or VE zones as designated in the FIS, and that are not fully licensed and highway ready, must meet all the provisions of Section 16.10.070(h)(5) unless they are on the site for less than 180 consecutive days. For the purposes of this ordinance, "highway ready" means on wheels or jacking system, attached to the site by quick disconnect utilities and security devices, and having no attached additions.

(xi) determination by the Planning Director on the basis of the geologic hazards assessment or geologic report that the mitigation of the hazards on the site is not dependent on shoreline protection structures except on lots where both adjacent parcels are already similarly protected.

(xii) The developer and/or the subdivider of a parcel or parcels in an area subject to geologic hazards shall be required, as a condition of development approval and building permit approval, to record a Declaration of Geologic Hazards with the County Recorder. The Declaration shall include a description of the hazards on the parcel, and the level of geologic and/or geotechnical investigation conducted.

(xiii) All other required state and federal permits must be obtained. (Ord. 4071, 7/17/90; 4518-C, 3/8/99)

effective 9/28/08

ORDINANCE NO. 5019

AN ORDINANCE AMENDING CHAPTER 16.10 OF THE SANTA CRUZ COUNTY CODE TO REDUCE MINIMUM PARCEL SIZE IN COUNTY SEISMIC REVIEW ZONES UNDER LIMITED CIRCUMSTANCES

The Board of Supervisors of the County of Santa Cruz ordains as follows:

SECTION I

Subdivision (a)(2) of Section 16.10.080 of the Santa Cruz County Code is hereby amended, to read as follows:

16.10.080 Project density limitations.

The following requirements shall apply to density calculations for new building sites created through minor land division, subdivision, or other development approval or permit:

(a) Fault Zones.

1. Exclusion from Density Calculations: The portion of a property within 50 feet of the edge of the area of fault induced offset and distortion of an active or potentially active fault trace shall be excluded from density calculations.

2. Creation of New Parcels and/or New Building Sites: The following standards shall apply to the creation of new parcels and/or building sites within State Alquist-Priolo Earthquake Fault Zones and County Seismic Review Zones:

   (i) All new structures shall meet setbacks as specified in Section 16.10.070(b)2.

   (ii) Outside of the Urban Services Line and the Rural Services Line, a twenty gross acre minimum parcel size shall be required, and a ten gross acre minimum parcel size shall be required for parcels within the portions of the County Seismic Review Zones that are not also part of a State Alquist-Priolo Earthquake Fault Zone, and are outside the Coastal Zone, if at least 25% of the perimeter of the original parcel to be divided is bounded by parcels of 1-acre or less in size.

SECTION II

This ordinance shall become effective on the 31st day following adoption.

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6. New Critical Structures and Facilities: Construction of critical structures and facilities, including the expansion of existing critical structures and facilities, and nonessential public structures shall be located outside areas subject to coastal hazards; unless such facilities are necessary to serve existing uses, there is no other feasible location, and construction of these structures will not increase hazards to life and property within or adjacent to coastal inundation areas.

7. Creation of New Parcels and Location of New Building Sites: New parcels or building sites created by minor land divisions, subdivisions or development approvals or permits, and multi-residential structures in coastal hazard areas shall conform to the following criteria:

(i) demonstration by a full geologic report that each proposed building site on the parcel is not subject to any potential hazards and that each site meets the minimum setback given in Section 16.10.070(h)1.

(ii) determination by the Planning Director based on the geologic report that the long-term stability and safety of the development does not depend or require shoreline protection structures;

(iii) the proposed development does not reduce or restrict public access and the proposed development does not require the construction of public facilities, structures, or utility transmission lines in coastal hazard areas or within the 25 foot or 100 year stability (whichever is greater) setback;

(iv) The developer and/or the subdivider of a parcel or parcels in an area subject to geologic hazards shall be required, as a condition of development approval and building permit approval, to record a Declaration of Geologic Hazards with the County Recorder. The Declaration shall include a description of the hazards on the parcel and the level of geologic and/or geotechnical investigation conducted.

8. Other Conditions: Other permit conditions including, but not limited to, project redesign, building site elimination, delineation of building and septic system envelopes, building elevation, foundation requirements and drainage plans shall be required as deemed necessary by the Planning Director. (Ord. 2088, 1/28/75; 2185, 9/23/75; 2258, 3/16/76; 2580, 8/8/78; 2631, 2/6/78; 3437, 8/23/83; 3598, 11/6/84; 3808, 4/15/86; 3892, 3/15/88; 3997, 6/6/89; 4518-C, 3/8/99)

16.10.075 Foundation design requirements in geologic hazard areas.

Notwithstanding whether or not it constitutes "development" under the provisions of this Chapter, all new or reconstructed foundations for habitable structures within designated seismic, flood plain or coastal hazard areas shall be designed by an engineer licensed by the State of California to perform structural calculations on buildings. (Ord. 4080, 9/11/90)

16.10.080 Project density limitations.

The following requirements shall apply to density calculations for new building sites created through minor land division, subdivision, or other development approval or permit:

(a) Fault Zones.

1. Exclusion from Density Calculations: The portion of a property within 50 feet of the edge of the area of fault induced offset and distortion of an active or potentially active fault trace shall be excluded from density calculations.

2. Creation of New Parcels and/or New Building Sites: The following standards shall apply to the creation of new parcels and/or building sites within State Alquist-Priolo Earthquake Fault Zones and County Seismic Review Zones:

(i) All new structures shall meet setbacks as specified in Section 16.10.070(b)2.

(ii) Outside of the Urban Services Line and the Rural Services Line, a twenty gross acre minimum parcel size shall be required.

(b) Landslides and Steep Slopes. The portion of a property with slopes over 30 percent in urban areas and 50 percent in rural areas, and the portion of a property within recent or active landslides, shall be excluded from density calculations. Landslide areas determined by a geologic report to be stable and suitable for development shall be granted full density credit.

(c) Floodways. The portion of a parcel within the one-hundred year floodway shall be excluded from any density calculations.

(d) Floodplains. The portion of a property within the one-hundred year floodplain shall be excluded from density calculations.

(e) Coastal Hazards. The portions of a property subject to coastal inundation, as determined by a geologic hazards assessment, geologic report, or adopted Flood Insurance Rate Map (FIRM), shall be excluded from density calculations. (Ord. 3340, 11/23/82; 3598, 11/6/84; 3808, 4/15/86; 4518-C, 3/8/99)

16.10.090 Project denial.

A development permit or the location of a proposed development shall be denied if the Planning Director determines that geologic hazards cannot be adequately

mitigated or the project would conflict with National Flood Insurance Program regulations. Development proposals shall be approved only if the project density reflects consideration of the degree of hazard on the site, as determined from the technical information as reviewed and approved by the Planning Director. (Ord. 3340, 11/23/82; 4518-C, 3/8/99)

16.10.095 Permits for repair of earthquake damaged dwellings and accessory structures within areas of earthquake-related ground failure and designated seismic hazard areas.

(a) Repair and Reconstruction Requiring a Development Permit Within Areas of Earthquake-Related Ground Failure. Notwithstanding any other provisions of this Chapter, a development permit for repair or reconstruction work constituting "development" under the provisions of this Chapter of dwellings and accessory structures within areas of ground failure outside the California Coastal Zone which were damaged as a result of the October 17, 1989 earthquake and its aftershocks may be approved even though there is an undetermined but potentially substantial risk from earthquake-related ground failure, provided that:

(1) The Planning Director determines on the basis of a geologic assessment or report of the dwelling site that any potential risk associated with ground failure resulting the October 17, 1989 earthquake (as documented in the geologic assessment or report) can only be evaluated by monitoring over time, and based on available information it does not appear to present a significant and immediate threat to life or of personal injury to persons residing on the subject property; and

(2) The Board of Supervisors has not determined that the area in which the dwelling is located is unsafe to occupy due to geologic hazards affecting the property; and

(3) The owner records a Declaration of Geologic Hazards with the County Recorder which describes the potential geologic hazards from any on-site or off-site geologic conditions, the level of prior geologic investigation conducted, and any geologic investigation in progress, and which includes agreement by the owner to assume all risks, waive all claims against the County. (Ord. 4048, 1/23/90; 4080, 9/11/90; 4149, 9/17/91; 4160, 12/10/91)

(b) Repair and Reconstruction Not Requiring a Development Permit Within Areas of Earthquake-Related Ground Failure. For repair and reconstruction of dwellings within areas of potential ground failure described in subsection (a) above for which no development permit is required under the provisions of this Chapter, the issuance of a building permit for such repair and reconstruction work shall be subject to proof of recordation of a Declaration of Geologic Hazards containing the information specified in paragraph (3) of subsection (a) above.

(c) Repair and Reconstruction Not Requiring a Development Permit Within Designated Seismic Hazard Areas or on Parcels for Which a Geologic Report Has Been Prepared. For repair and reconstruction of dwellings within designated seismic hazard areas, or on any parcels for which a geologic report has been prepared, which does not require a development permit under the provisions of this Chapter, the issuance of a building permit for such repair and reconstruction work shall be subject to proof of recordation of a Notice advising that a building permit is being obtained for repair of earthquake damage, the level of prior geologic investigation conducted, if any, and that the permit is being issued without any additional requirement for geologic review based on a determination that the repairs will not exceed 50 percent of the market value of the structure before it was damaged. (4080, 9/11/90; 4160, 12/10/91)

16.10.100 Exceptions.

(a) Request for Exception: A request for an exception to the provisions of this chapter or the permit conditions may be considered by the Planning Director if the exception is necessary to mitigate a threat to public health, safety and welfare.

(b) Reason for Request. A request for an exception shall state in writing the reason why the exception is requested, the proposed substitute provisions, when the exception would apply, and the threat to public health, safety, or welfare that would be mitigated.

(c) Required Findings: In granting an exception, the Planning Director shall make the following findings:

1. that hardship, as defined in Section 16.10.040(2j), exists; and

2. the project is necessary to mitigate a threat to public health, safety, or welfare.

3. the request is for the smallest amount of variance from the provisions of this Chapter as possible; and,

4. adequate measures will be taken to ensure consistency with the purposes of this chapter and this Chapter and the County General Plan. (Ord. 3340, 11/23/82; 3598, 11/6/84; 4518-C, 3/8/99)

(d) Exceptions for projects in the Special Flood Hazard Area: For projects in the SFHAs the following additional procedures and provisions also apply:

1. Nature of exception. The exception set forth in this section of the ordinance are based on the general principle of zoning law that exceptions pertain to a piece of property and are not personal in nature. An exception may be granted for a parcel of property with physical characteristics so unusual that complying with the requirements of this ordinance would create an exceptional hardship to the applicant or the surrounding property owners. The characteristics must be unique to the property and not be shared by adjacent parcels. The unique characteristic must pertain to the land itself, not to the structure, its inhabitants, or the property owners.

The interest in protecting citizens from flooding is compelling, and the cost of insuring a structure built below flood level so onerous that exceptions from the flood elevation or other health and safety requirements in the flood ordinance shall be granted in rare circumstances and only where no other alternative is available.

2. Criteria for exceptions.

(i) In considering requests for exceptions, technical evaluations, all other relevant information and standards specified in other sections of this Chapter shall be considered, including the following:

a. Danger that materials may be swept onto other lands to the injury of others;

b. Danger of life and property due to flooding or erosion damage;

c. Susceptibility of the proposed structure and its contents to flood damage and the effect of such damage on the existing individual owner and future owners of the property;

d. Importance of the services provided by the proposed structure to the community;

e. Necessity to the structure of a waterfront location, where applicable;

f. Availability of alternative locations for the proposed use which are not subject to flooding or erosion damage;

g. Compatibility of the proposed use with existing and anticipated development;

h. Relationship of the proposed use to the comprehensive plan and floodplain management program for that area;

i. Safety of access to the property in time of flood for ordinary and emergency vehicles;

j. Expected heights, velocity, duration rate of rise, and sediment transport of the floodwater expected at the site; and

k. Costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water system, and streets and bridges.

(ii) Any applicant to whom an exception is granted shall be given written notice of the terms and conditions, if any, of the exception, and said notice shall also include the following:

a. That the issuance of an exception to construct a structure below the base flood level will result in substantially increased premium rates for flood insurance up to amounts as high as $25 for $100 of insurance coverage; and

b. That such construction below the base level increases risks to life and property.

c. That a copy of the written notice shall be recorded on the deed so that it appears in the chain of title of the affected parcel of land.

(iii) The Floodplain Administrator will maintain a record of all exception actions, including justification for their issuance, and report such exceptions issued in its biennial report submitted to the Federal Insurance Administration of the Federal Emergency Management Agency.

3. Conditions for Exception.

(i) Exceptions may be issued for new construction, substantial improvement, and other proposed new development to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, providing that the procedures of Sections 16.10.050, 16.10.070, and 16.10.080 of this chapter have been considered. As the lot size increases beyond one-half acre, the justification required for issuing the exception increases.

(ii) Exceptions shall not be issued within any mapped regulatory floodway if any increase in flood levels during the base flood discharge would result from the project.

(iii) Exceptions shall only be issued upon a determination that the exception is the "minimum necessary" considering the flood hazard, to afford relief. "Minimum necessary" means to afford relief with a minimum of deviation from the requirements of this Chapter. For example, in the case of exceptions to an elevation requirement, exceptions need not be granted for permission for the applicant to build at grade, or even to whatever elevation the applicant proposes, but only to that elevation which will both provide relief and preserve the integrity of the regulatory requirements.

(iv) Exceptions shall only be issued upon:

a. Showing of good and sufficient cause;

b. Determination that failure to grant the exception would result in a "hardship" (as defined in Section 16.10.040) to the applicant; and

c. Determination that the granting of an exception will not result in increased flood heights, additional threats to public safety, or extraordinary public expense; create a nuisance, cause fraud or victimization of the public, or conflict with existing local laws or ordinances.

(v) Exceptions may be issued for new construction, substantial improvement, and other proposed new development necessary for the conduct of a functionally dependent use (a functionally dependent use is one that would not function or operate unless sited on or adjacent to flood prone location in question), provided that the provisions of this section are satisfied and that the structure or other development is protected by methods that minimize flood damages during the base flood, does not result in additional threats to public health or safety, and does not create a public nuisance.

(vi) Exceptions may be issued for the repair or rehabilitation of historic structures (as defined in Section 16.10.040) upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as an historic structure and that the exception is the minimum necessary to preserve the historic character and design of the structure.

(vii) Upon consideration of the factors in Section 16.10.100(d)2i and the purposes of this Chapter, conditions may be attached to the granting of exceptions as necessary to further the purposes of this Chapter. (Ord. 3340, 11/23/82; 3598, 11/6/84; 4518-C, 3/8/99)

16.10.105 Notice of geologic hazards in cases of dangerous conditions.

(a) Whenever a site inspection, geologic hazards assessment or full geologic report identifies the presence of a geologic hazard that causes a site, building, structure, or portions thereof to be rendered unsafe or dangerous, then pursuant to the Uniform Code for the Abatement of Structural and Geologic Hazards as amended by subsection (l) of Section 12.10.070 of this Code, the Planning Director may issue a Notice of Geologic Hazard and Order thereon, and may record a Notice of Geologic Hazard with the County Recorder.

(b) The Planning Director may initiate abatement procedures pursuant to the Uniform Code for the Abatement of Structural and Geologic Hazards as amended by Section 12.10.070(l) of the County Code. (Ord. 4336, 11/29/94; 4392A, 4/2/96; 4518-C, 3/8/99)

16.10.110 Appeals.

Except as otherwise provided herein, appeals taken pursuant to the provisions of this Chapter shall be made in conformance with the procedures of Chapter 18.10, including appeal of the requirement for geologic hazard assessment or technical report. All appeals taken concerning the decision to issue and record a Notice of Geologic Hazard pursuant to the provisions of Section 16.10.105 shall be governed by the procedures commencing with Section 501 of the Uniform Code For the Abatement of Structural and Geologic Hazards as amended by paragraphs 10 through 14 of subsection (al) of Section 12.10.070 of this Code. (Ord. 2088, 1/28/75; 2281, 4/20/76; 3598, 11/6/84; 3808, 4/15/86; 4336, 11/29/94; 4392A, 4/2/96; 4518-C, 3/8/99)

16.10.120 Violations.

A. Compliance. No structure or land shall hereafter be constructed, located, extended, converted, or altered without full compliance with all the provisions of this Chapter and other applicable regulations. Nothing herein shall prevent the taking of lawful action as necessary to prevent or remedy any violation.

B. Actions Constituting Violation. In the event of a violation of this Chapter or of the provisions of permit conditions as specified in this Chapter, or if the permit has been exercised in a manner which creates a nuisance or is otherwise detrimental to the public health, safety and welfare, the permittee shall be given notice of such violation, and a reasonable time shall be specified for its correction. (Ord. 3340, 11/23/82; 3598, 11/6/84; 4392A, 4/2/96; 4518-C, 3/8/99)

16.10.130 Fees.

Fees for the geologic hazards assessment, other field reviews, applications for exceptions, and the review of technical reports shall be set by resolution by the Board of Supervisors. (Ord. 3340, 11/23/82; 3598, 11/6/84; 3808; 4518-C, 3/8/99)